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THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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Reading Matter Contents.....page 1563
Alphabetical Index to Advertisers " 169
Classified List of Advertisers.... " 161
Advertising and Subscription Rates " 168

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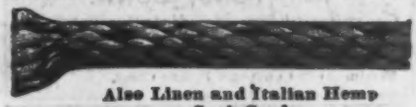

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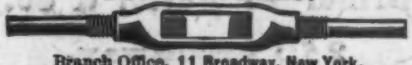

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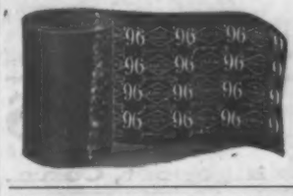

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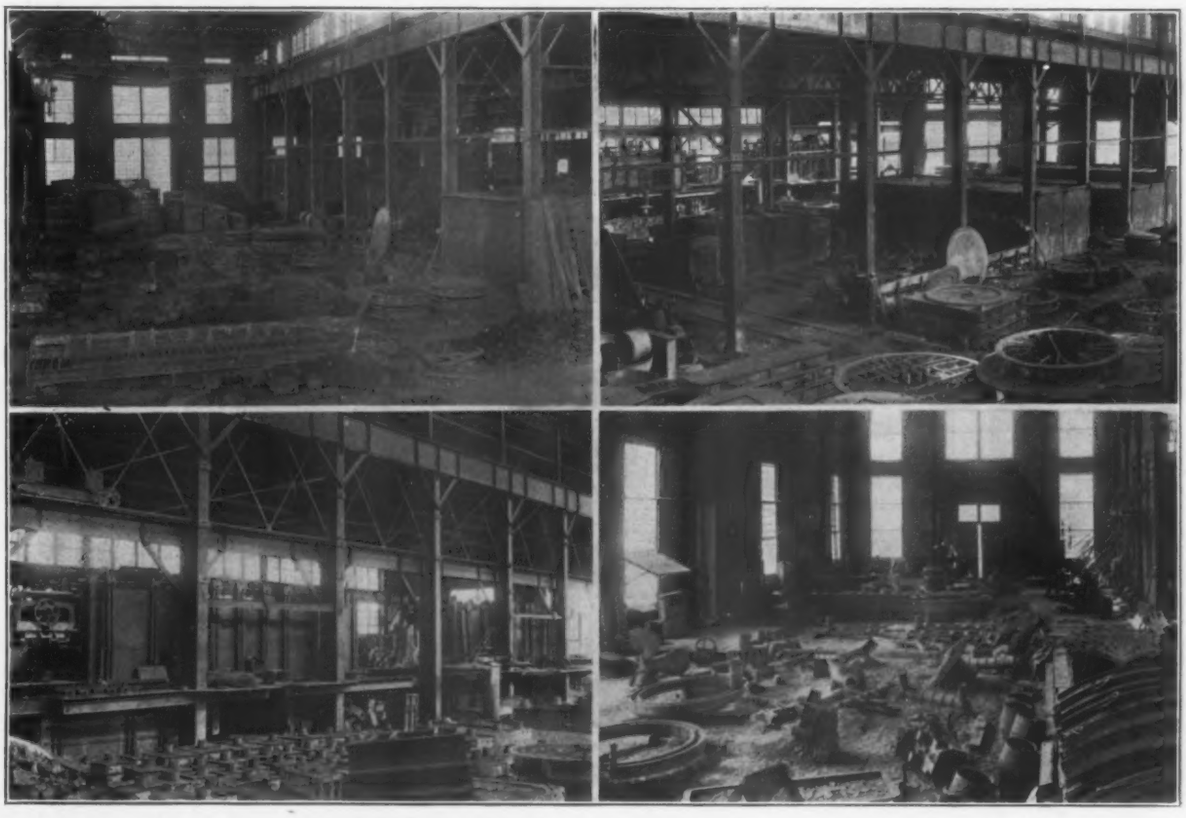
THE IRON AGE

New York, Thursday, May 11, 1905.

The Works of the Birdsboro Steel Foundry and Machine Company.

The Birdsboro Steel Foundry & Machine Company is the new name of the Diamond Drill & Machine Company. The organization remains the same and the products previously manufactured will continue to be regular lines, but as the scope of work has been enlarged by engaging in the making of steel castings it seemed desirable and appropriate to adopt a name that should indicate the fact. The company is now prepared to furnish open hearth steel, air furnace iron, semisteel and cupola castings, machine molded steel and iron gears, cast steel pipe fittings, rolling mill and hydraulic machinery, punches and shears, slitting shears, Wagner cold saw cutting off machines and Jackson belt lacing machines. The castings are furnished rough or finished, and a specialty is made of machinery constructed in accordance with the purchaser's specifications. The additions to the plant and the new equipment necessary to engage in the making of steel castings occasioned the present article, for the facilities and arrangements for the handling of the new work are decidedly modern and contain many valuable suggestions well worth careful examination.



Molding Floor, Looking Toward the Sand Bins, Showing a Locomotive Frame Flask in the Foreground and One of the Core Ovens on the Right.

Molding Floor, Looking in Opposite Direction, Showing the Sand Grinder, Core and Drying Ovens, and in the Background the Furnaces.

Casting Floor, Showing on the Left the 25-Ton Open Hearth Furnace; on the Right the 20-Ton Furnace, and in the Foreground Molds Ready for Pouring.

Cleaning Floor and Machine Shop, Showing Annealing Furnace in the Right Foreground and the Machine Tools in the Rear.

FIG. 1.—VIEWS IN THE STEEL PLANT OF THE BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY.

The plant is located at Birdsboro, Berks County, Pa., on the Schuylkill division of the Pennsylvania Railroad and the main lines of the Philadelphia & Reading and the Wilmington & Northern railroads, all of which offer excellent shipping facilities. In the matter of distances Birdsboro is conveniently central, being 49 miles from Philadelphia, 139 miles from New York and 9 miles from Reading. The plant includes the following departments, which will be treated in order: Steel foundry, iron foundry, Nos. 1 and 2 machine shops, smith shop, power house, boiler house, pattern shop and pattern storage. The relation of these departments and the service afforded by the railroads are indicated in the plan of the plant given in Fig. 2. For convenience, although not strictly true, the top of the plan will be considered the north in the references to it which are made later on.

The Steel Foundry.

As will be seen from Fig. 2, the steel plant is laid out with the molding floor parallel with the casting and cleaning floor. The building is of brick and steel construction with a slag roof. On the molding floor, which is shown in the two upper views, Fig. 1, the flasks are prepared, being handled by two overhead traveling cranes built by the Morgan Engineering Company. These cranes have a span of 60 feet and the runways are 30 feet above the floor. One is a 20-ton crane with a 5-ton auxiliary hoist and the other a 25-ton crane with a 10-ton auxiliary. Completed molds are conveyed by the cranes to the north end of the floor, upper right view, Fig. 1, and are

placed upon cars standing on tracks leading into the drying ovens. The ovens, of which there are four, are between the casting and molding floors, and open on both sides. Each is 40 feet long by 18 feet wide, walled with brick and closed at the ends by Kinnear rolling steel doors. The furnaces are at the sides and connect with an underground flue leading to a stack at the north end of the building. This flue is continued south beyond the present installation of ovens to afford ready connection with future ovens that may be added when it becomes necessary.

After the molds have been dried over night the doors on the casting floor side are opened and the cars are drawn out by means of a snatch tackle or one of the cranes. The flasks are lifted off by the cranes over the casting floor and placed where desired. The empty cars are then carried by the cranes to a track between the crane operator from his cage and tripped to discharge its load.

Flanking the main molding floor on the east is a lean-to 30 feet wide in which small castings are molded. This room is served by a 10-ton crane 18 feet above the floor, built by the Whiting Foundry Equipment Company. This department contains a gear molding machine for making machine molded cast steel gears up to 60 inches diameter by 18 inches face. This lean-to and the part of the building which it adjoins, containing the main molding floor, the drying ovens and core department, are 220 feet long. At the corner near the sand bins and the cleaning floor there is a sand blast room containing apparatus furnished by the J. W. Paxson Company, Philadelphia. Above the molding floor in the lean-to is a gallery the full length and width of the lean-to which is used as a storage for patterns in active use—that is, patterns used

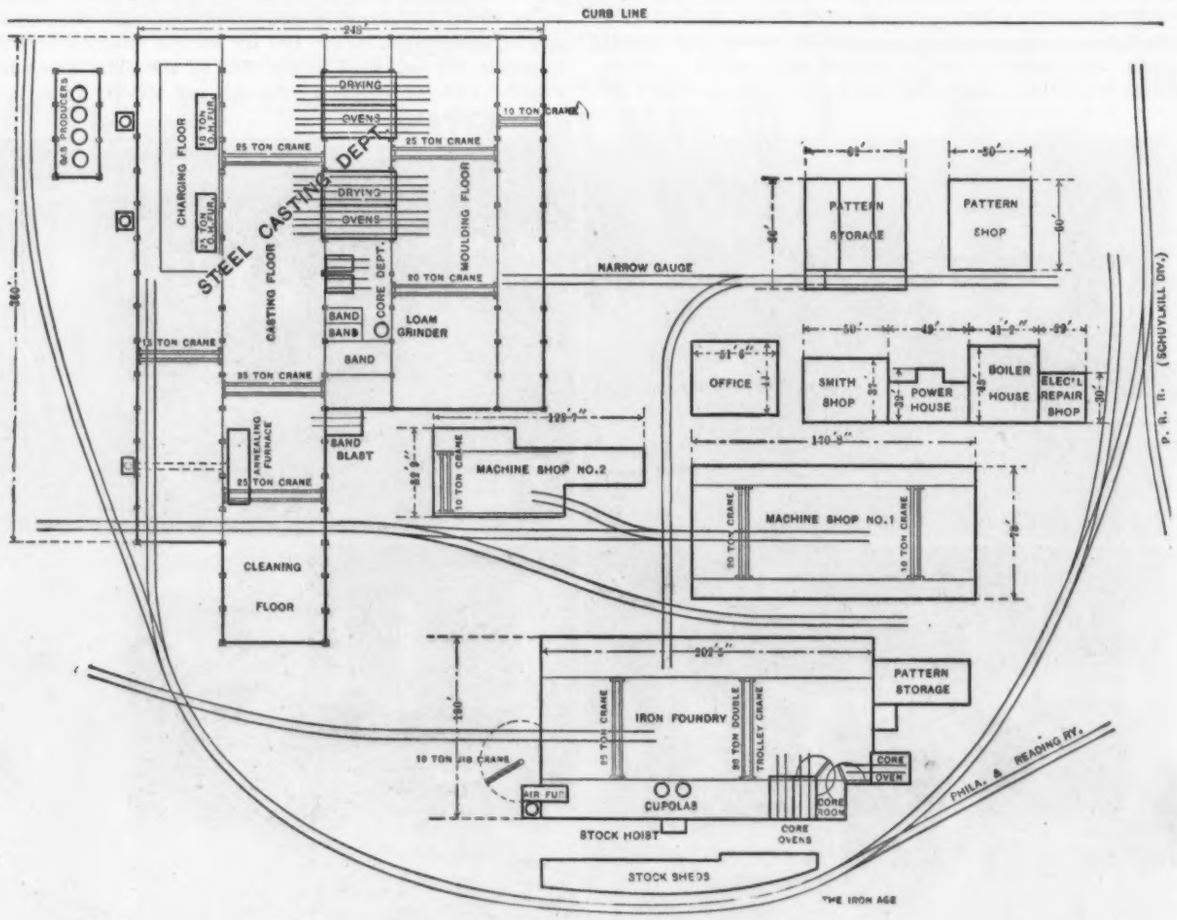


Fig. 2.—Plan of the Works of the Birdsboro Steel Furnace & Machine Company.

ovens (not shown on the plan), extending with a down grade into the molding room, and return by gravity, to be in readiness to be placed on the oven tracks to receive fresh undried molds. The same continuous process is followed in the making of cores and a similar one obtains in the handling of the flasks after the pouring. The flasks after being shaken out are placed on a car which runs on a track between the sand bins and the south end of the building, and the cars are shoved through to the end of the molding floor and the flasks unloaded. The two core ovens are between the drying ovens and the sand bins. Adjacent to the bins there is a loam grinder, a part of which may be seen in the lower left corner of upper right view, Fig. 1. The loam grinder was furnished by the Vulcan Iron Works, Chester, Pa., and is used mainly for mixing the material used for cores and breaking up the lumps. The sand is shaken out of the flasks on the casting floor near the sand bins, is loaded into buckets and raised by one of the cranes to a chute leading into the bins. The bucket in dumping position is at a hight where it may be reached by the so frequently and regularly that the storing of them in the pattern storage building would mean a considerable waste of time in getting and returning them. The racks in this gallery are not supported from the floor after the usual manner, but are hung from the roof trusses.

The casting floor and cleaning floor are end to end and form a bay 60 feet wide by 360 feet long. These are shown in the two lower views, in Fig. 1. In this bay there are two 25-ton Morgan cranes with 5-ton auxiliaries and one 35-ton Whiting crane with a 10-ton auxiliary, used for handling flasks, cars and castings, as already alluded to. This section is further divided into a dry floor, chipping floor and machine shop, where the sink heads are cut off, and contains an annealing furnace 10 feet wide, 10 feet deep and 40 feet long. In the machine shop division the following tools are driven in a group by a Westinghouse motor: A Wagner cold saw, a Gould & Eberhardt shaper and two 40-inch cold saws. The remainder of the tools are individually driven by electric motors, all of Westinghouse make, these including two 26-inch saws, a draw

stroke planer or shaper, with vertical reciprocating tool, built by the Morton Mfg. Company, Muskegon, Mich., and an open side planer built by the Detrick & Harvey Machine Company, Baltimore, Md. The latter two machines are used particularly for the rough finishing of steel castings, the removing of sink heads, &c.

Parallel to the casting floor is the wing containing the open hearth furnaces, lower left view, Fig. 1, the remaining space being used now for the storage of scrap. Over the charging floor and running the length of the wing there is a 15-ton 50-foot span Whiting crane, with its runway 22 feet above the floor. This is used for charging the furnaces, with the assistance of a paddle, no special charging machine being used for that purpose. This method seems in this case to be preferable for two reasons: The scrap is of a more or less variable character, and the crane is decidedly convenient when there is occasion to handle heavy parts in repairing the furnaces. The two furnaces have capacities, respectively, of 18 and 25 tons, though the former is continually doing 20 tons and the other proportionately more than it is rated for. The furnaces and the four 10-foot gas producers serving them are located in an adjoining building and were supplied by J. A. Herrick, Philadelphia.

The Iron Foundry.

The building containing the iron foundry is of brick and steel construction, with a slag roof. An interior view is given in Fig. 3, looking down the central bay, which is 60 feet wide by 202½ feet long, and is flanked on each side by a wing about 29 feet wide. Two cranes serve the central bay. One is a 25-ton Morgan crane with a 10-ton auxiliary hoist and the other is a double trolley crane, each of the trolleys having a capacity of 15 tons, made by Alfred Box & Co., Philadelphia. It will be noticed that these cranes, like most of those in the other buildings, have a span of 60 feet, a dimension purposely adhered to in designing the buildings to make the cranes interchangeable as far as possible. The hights of the runways vary, but not enough to affect the interchangeability. The cranes in the iron foundry are about 25 feet above the floor.

Small castings are made in the wing on the north side. The wing on the south side contains the coreroom, served by two 3-ton jib cranes, two core ovens, two cupolas of 5 and 10 tons capacity per hour and an air furnace with a capacity of 20 tons. The air furnace is served by a 10-ton electric jib crane and was made from the company's own designs. The small cupola was furnished by the J. W. Paxson Company and the large one by the Whiting Foundry Equipment Company, which also supplied the air hoist used for charging the cupolas. Wilbraham positive pressure blowers furnish the blast for the cupolas, one being a No. 5 size and the other a No. 4. Both are driven by a single 40 horse-power Westinghouse motor, which also drives a centrifugal sand mixer made by the William Sellers Company, Philadelphia, and a revolving screen sand sifter. One of the 3-ton jib cranes serving the core ovens is equipped with an electric hoist made by the Sprague Electric Company, and the other with an air hoist made by the Chicago Pneumatic Tool Company. In the small castings department there is another core oven, a rattler and grinding wheels, motor driven; a sand sifter, operated by air, made by the Hanna Engineering Company, and a small storage space for patterns in active use.

Much of the work done in the iron foundry is for the company's own products, including air furnace rolls and pinions and rolling mill castings, in addition to which a general jobbing business is carried on. The capacity of this plant is 750 tons per month, and single castings have been made weighing as much as 40 tons.

Machine Shop No. 1.

This building is of stone construction three stories high. It is over 170 feet long and has a main floor 30 feet wide, with wings on either side 24 feet wide. The central section, which is used as an erecting floor and contains the larger tools, sometimes requiring the service of a crane, is shown in Fig. 4. It is commanded by one 20-ton Whiting crane, with its runway at a hight of 20 feet from the floor, and a 10-ton crane with rope drive, made by the company, traveling on a runway 40 feet above the floor. All of the heavy tools are on the main floor, among them being an 18 x 22 foot boring mill, made by the company; an 8 x 8 x 25 foot planer, made by the Betts Machine Company; a 36 x 42 inch by 10 foot Pond planer and a 62-inch lathe. Other tools include two horizontal boring machines, a slotter, thirteen lathes of various sizes, four drill presses, a centering machine, bolt cutter, double head shaper, a boring mill and a pulley turning machine. Lighter tools are placed on the second floors of the wings, these comprising nineteen lathes, six drill presses, a shaper, six milling machines, two planers, a turret lathe, slotter, a four-spindle drill and two grooving machines. One of these galleries is used for the testing and erection of small sizes of the Wagner cold saws. For the testing a variable speed device is used between the line shaft and the machine being tested, so that the latter may be run and tested at its rated speed. The opposite gallery is given up to the making of the belt lacing machines and diamond drills which this com-

Fig. 3.—A View in the Iron Foundry, Taken from the Core Shop End.—At the Left Are the Core Ovens, with the Cupolas Beyond and the Air Furnace Almost Hidden by the Loam Mold.

pany has marketed for so many years. The third floors of the wings are at present used for storing diamond drilling machinery and equipment.

Machine Shop No. 2.

Machine shop No. 2 is an old frame building of irregular shape, as may be seen from the plan, the major part of it being served by a 10-ton Whiting crane having its runways 15 feet from the floor. It contains three 40-inch lathes built by the Draper Machine Tool Company, Worcester, Mass., and a Fifield gun boring lathe capable of boring a 9-inch hole to a depth of 30 feet. The work done in this shop is almost exclusively on steel castings, particularly high pressure steel pipe fittings. For this work there was recently added to the machine tool equipment a multiple spindle drill built by the Baush Machine Tool Company, Springfield, Mass., which is used for simultaneously drilling the bolt holes in the flanges of large pipe fittings. Additional machinery for finishing these fittings is shortly to be installed, but at present the balance of the shop is used as erecting space.

Fig. 4.—The Interior of Machine Shop No. 1 of the Birdsboro Steel Foundry & Machine Company.

The Smith Shop.

The smith shop, power house, boiler house and electrical repair shop are in contiguous buildings adjacent to the No. 1 machine shop. The smith shop is 50 x 37 feet and contains three forges and an 800-pound steam hammer from the Bement-Miles (Philadelphia) division of the Niles-Bement-Pond Company. The blower for the forges is driven by a 10 horse-power horizontal steam engine, formerly a regular line of the company. The little engine has pretty constant and fairly severe service to perform, and although it has been at it for over 20 years seems still to be worth retaining, particularly as steam has to be brought to the building for the hammer.

The Power House and Boiler Plant.

The power house is 49 feet long by 32 feet wide at its widest point and originally contained a horizontal steam engine belted to a 50-kw. generator. Within the same space there is now accommodated a total capacity of 350 kilowatts, with room for 250 more, and this in addition to the space occupied by an air compressor. The engine generator sets, two in number, consist of a 160 horse-power 15 x 14 inch Ames horizontal engine direct connected to a 100-kw. General Electric generator and a 350 horse-power Westinghouse compound automatic engine direct connected to a 250-kw. General Electric generator. The air compressor supplies compressed air which is piped to all parts of the works for the operation of air lifts, pneumatic chippers and hammers, a sand sifter, and for cleaning purposes. It is an Ingersoll-Sergeant two-stage compressor with simple steam ends and has a capacity of 500 cubic feet of free air per minute.

It might have been mentioned in connection with the descriptions of those departments that in both foundries and the machine shops there are connections on every column for obtaining compressed air, so that it is available through short lengths of hose in all parts of those buildings. The most original use of compressed air is in the steel foundry, where it is used for cleaning out the molds just prior to casting. The originality lies in the manner in which it is used, the dirt being removed by suction for the most part, although in some cases it is blown out. The device is used in either way and in its principle of action resembles a steam injector. The air is blown out through a direct pipe and the dirt is drawn through a suction pipe at right angles to the blast pipe, and is discharged with the air. If the device is to be used for blowing the discharge pipe is directed into the mold; otherwise it is directed away from it so as to dispose of the dirt where it will not be harmful, and the suction pipe is passed over the parts of the mold to be cleaned. The work is done thoroughly and in a small fraction of the time that would be required in the more laborious process of picking the dirt out.

The equipment of the boiler house consists of one 100 horse-power Babcock & Wilcox, one 100 horse-power Gill and one 200 horse-power Edge Moor water tube boilers, a boiler feed pump, a feed water heater and an in-

jector. The coal is conveniently received upon an overhead trestle connecting with the main lines of the several railroads and is dumped directly into bins, from which it is taken as needed. The Edge Moor boiler is the one usually used for power purposes and generates steam at 125 pounds pressure. The other boilers are reserves except in winter, when one is used to help out the exhaust steam in the heating of the buildings. The little shop adjoining the boiler house is a repair shop, in which repairs are made to motors and other electrical parts of the equipment of the plant.

The Pattern Shop and Pattern Storage.

The pattern shop is a three-story brick building with slate roof. The wood working machinery which it contains is confined to the first and second floors and includes a planer, surfacer, band saw, buzz saw and two lathes. These are all driven from shafting which belts to a 40 horse-power Westinghouse motor. The benches are disposed around the walls of the rooms. The third story is used as a storage for lumber.

The pattern storage is a four-story brick building with slate roof. It is divided lengthwise, as indicated in the plan, by 13-inch brick walls from the ground floor to the roof, so that there are in all twelve large rooms. Communication to all of these can be had only from the exterior. A platform is erected on a level with each floor and an elevator at one end completes the means of transporting material to any one of the twelve compartments. The elevator has a capacity of 3 tons and was furnished by the Albro-Clem Elevator Company.

Notes from Great Britain.

The Market.

LONDON, April 29, 1905.—A number of good contracts were placed among iron and steel makers prior to the Easter vacation. Since then nothing has been done, but specifications are expected in some numbers in a few days. Additional inquiries for pig iron are being made, which is not surprising in view of the fact that some stocks have been reduced during the past quarter, and smelters admit that they are behindhand with their deliveries. In steel there is no particular change to be noted. For the present there seems little chance of German material being offered on the low terms that prevailed last year, and for British material the quotation averages about £4 10s. for Bessemer qualities of sheet bars. In some cases half a crown more is asked, but buyers' idea of price is nearer £4 7s. 6d. Hematite pig iron is fairly steady, but the volume of trade doing is not increasing, although there are still indications of a considerable improvement in the demand for Bessemer classes of iron. Makers expect to be much busier shortly, and in the meantime are fairly well sold forward. Mixed Bessemer numbers are firm at 58 shillings 8 pence net, f.o.b., and warrant iron is 58 shillings 4½ pence net, cash sellers, at a month. Stocks are low. Iron ore is in better demand at 9 to 10 shillings net, at mines. Steel makers are brisk on heavy rails and are doing rather more in plates, but other departments are quiet. Shipbuilding orders of some importance are expected every day.

British Purchase of German Coke.

Cammell, Laird & Co. have entered into a large contract for German coke for their Cumberland works, the first cargo of which is timed to arrive at Workington in the first week of May. Mechanically and chemically this coke is said to be equal, if not superior, to the best Durham brands, and can be delivered at cheaper rates than are being asked to-day. This step has been taken in view of the threatened withdrawal at the end of June of the 10 per cent. rebate on the carriage of coke which the West Coast coke consumers have enjoyed during the depression of the last few months. While the rebate is to be withdrawn on coke for the West Coast, it is to be continued to the Staffordshire and Midland works. The matter has been discussed by the West Cumberland Iron Masters' Association, and the ultimate result of the correspondence which has passed between that body and the railway companies will be a joint meeting of representatives of both. The withdrawal of the rebate is a serious consideration for large users of coke, such as Cammell, Laird & Co., whose consumption totals 6000 tons a week. I understand that the other large works on the West Coast are adopting the same course as Cammell, Laird & Co.

The Iron and Steel Institute's Autumn Session.

A meeting of the Executive Committee appointed to carry out arrangements in connection with the visit of the Iron and Steel Institute to Sheffield in September next was held at the Cutlers' Hall last week. The Finance Committee reported that donations received to date amounted to £145 10s., which, added to the guarantees—amounting to £5857 1s.—made a total of £6002 11s. The headquarters of the Institute will be the new university buildings, where all the business part of the meeting will be conducted. Concerning the question of accommodation, it was reported that apart from private hospitality the hotels in Sheffield and those within easy reach outside the town appeared to be able to provide ample accommodation. Among the entertainment items of the programme are to be included a luncheon and dinner given by the Sheffield Reception Committee, excursions to places of interest in the neighborhood, and a reception and ball by the Lord Mayor and the president of the Institute, respectively. Various firms have signified their intention to invite delegates to view their works, and Thomas Firth & Sons, Hadfield's Steel Foundry Company and William Cook & Co. are making arrangements to entertain parties of delegates at luncheon.

Foreign Railroad Developments.

The influence of Japan on China has resulted in, among other things, a steadily progressive plan for the opening up of the mining regions by means of railroad extensions and new schemes. These are mainly in the hands of English capitalists. Two new proposals of this kind are reported to have taken concrete form within the last few days, one the line to connect Hankau with several important towns north and south of the Yangtse and traversing mineral areas, in which iron, coal (both bituminous and anthracite), copper and tin deposits of great value are known to exist. These have for the most part been undeveloped owing to the extortionate demands of officials, the difficulty of carrying up proper modern machinery and appliances and of getting the mineral iron down to the railways and coast. A second scheme of similar character and particularly complementary to the first named is to connect Canton with Cheng-tu, the capital of the province of Syechuen, which is at the very head of the Yangtse River navigation. Concessions have already been granted to an English syndicate for lines to run round the boundary of the prosperous area in the neighborhood of Shanghai, and to connect with that by new roads nine other important centers we have hitherto had no real facility for communication with.

The Cape to Cairo Railroad will shortly reach Kalomo, 100 miles north of Victoria Falls, where the administrative center of northwestern Rhodesia is situated. The line will immediately be continued to Broken Hill, where large copper and zinc mines are situated, some 250 miles further north. Nothing has yet been decided as to the route to be followed after Broken Hill is reached. It is expected that the new bridge over the falls will be opened for traffic early in June.

Very shortly the first sod may be cut in the construction of an important new railroad in South Africa which will unify the trade of the four colonies of Natal, the Transvaal, the Orange River Colony and Cape Colony and materially promote the commercial and political unification of British South Africa as a whole. Moreover, the construction of this railroad will considerably enlarge the demand for railroad material in South Africa in the near future.

The Growing Demand for Aluminium.

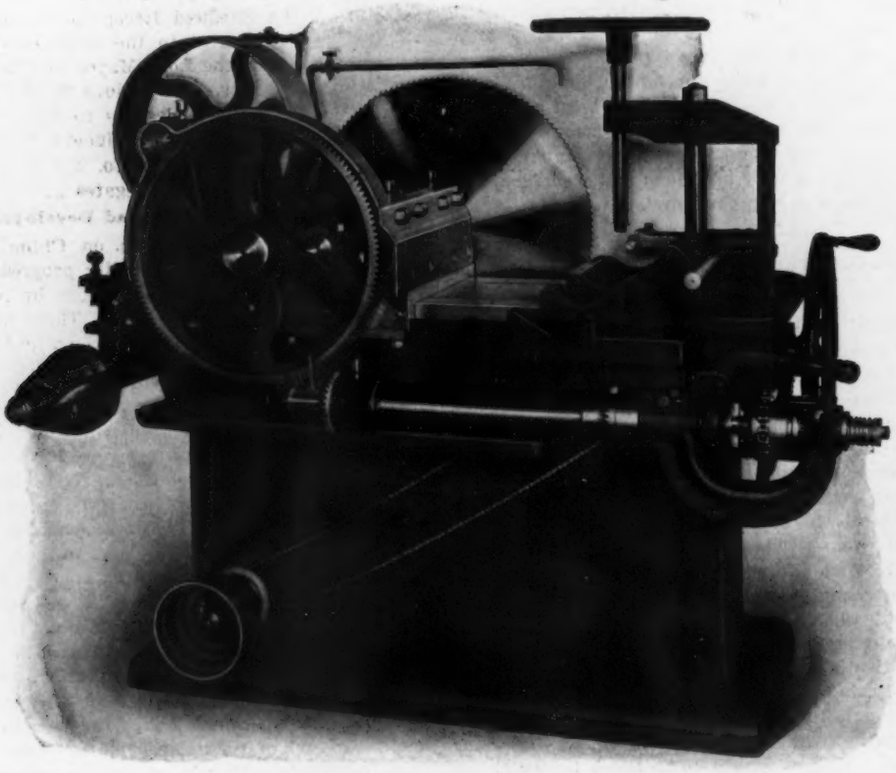
A feature of the market just now is the growing demand for aluminum. Thus the chairman of the British Aluminum Company at its annual meeting attributed the progressive improvement of the company to greatly increased sales. The continuous expansion in the demand for aluminum emphasized the necessity of hastening as much as possible the completion of the Loch Leven power works.

S. G. H.

The Nutter-Barnes Cutting Off Machine.

The metal cutting off machine shown in the accompanying illustration is designed for heavy work, taking stock up to 10 inches in diameter. It is styled a central drive machine, since the pulley is not overhung. The pulley shaft carries a pinion which meshes with a gear on the saw shaft giving a ratio of about 10 to 1, providing ample power to drive a 25-inch saw, 3-16 inch thick, through metal.

The machine has a positive automatic feed, belt driven from a cone affording five changes of feed, ranging from 1-5 to ½ inch per minute. The feed mechanism is driven by a worm on a tilting pulley shaft through a worm gear to the feed screw. The feed is thrown in by a lever which lifts the feed pulley shaft until the worm and worm gear are in mesh and locks them there. A quick return of the saw after completing a cut is obtained by a feed clutch, which throws in an idler sprocket connected by a chain to a sprocket on the feed screw. With this the complete travel of the head is accomplished in 40 seconds. The mechanism is plainly shown in the illustration, which is of the rear of the machine.



The New No. 7, 10-inch, Cutting Off Machine, Built by Nutter, Barnes & Co., Boston.

The total weight of the tool is about 3000 pounds. It is built by Nutter, Barnes & Co., 386 Atlantic avenue, Boston, Mass., which firm also makes an automatic saw sharpener usually furnished with the cutting off machine. The feature of the sharpener is that the saw is spaced, not from its teeth, but from a ratchet having the same number of teeth as the saw to be sharpened. This insures the maintaining of the uniformity of the teeth and contributes to better and more accurate work.

The Worth Brothers Company, Coatesville, Pa., proposes to erect another plate mill containing 132-inch finishing rolls, together with tables, straightening rolls and all other appurtenances and equipment necessary to make the mill modern and complete in every detail. The erection of this mill will be pushed with the utmost dispatch, and as soon as it is completed and can take care of orders now being made on some of the company's older and smaller mills they will be improved and modernized. This company has had in successful operation for a couple of years a mill containing 152-inch plate rolls, which is the largest and most complete mill on the continent. This mill is being steadily operated to its full capacity.

Powdered Coal for Cement Kilns.—The National Cement Works, Martin's Creek, Pa., in its recently completed plant has installed an effective mechanical arrangement for feeding fuel to the rotary kilns. Powdered coal is used and is supplied under forced draft. The coal burning apparatus was furnished by the B. F. Sturtevant Company, Boston, Mass., and includes three 42-inch centrifugal blowers, which deliver through a system of ducts into 5-inch branch pipes leading into each kiln. The air handled by each blower is partially heated by being drawn through the rotary clinker coolers and thence through the passages, where the hot clinker falls from the kiln to the rotary cooler. At the bottom of the pulverized coal bin is provided a special controllable feed device which regulates the quantity of fuel and the proportionate volume of air. Compressed air at 45 pounds pressure is also introduced into the center of the 5-inch pipe near the kiln end.

Testing Machine for Lubricating Oil.—A new machine for testing lubricating oils, which seems to be a very convenient one to use, has been brought out by the Elektricitats-Aktien-Gesellschaft, Frankfort, Germany. The testing part is a short shaft running in a bearing, the pressure upon which may be regulated. The shaft is driven by an electric motor or other mechanical means, or by hand, the speed being adjustable, and the bearing, by an arrangement of electric coils, may be heated up to any required temperature. About ½ pint of the oil to be tested is poured into the bearing and the shaft is revolved until it attains a definite speed. Power is then cut off and the lubricating value of the oil is judged from the time that elapses before the shaft comes to rest. After each test the shaft is effectively and quickly cleaned by pouring over it a liquid in which the oil is soluble and then removing the liquid by a blast of air.

Motor Drive on a Cincinnati Twenty-four-Inch Shaper.

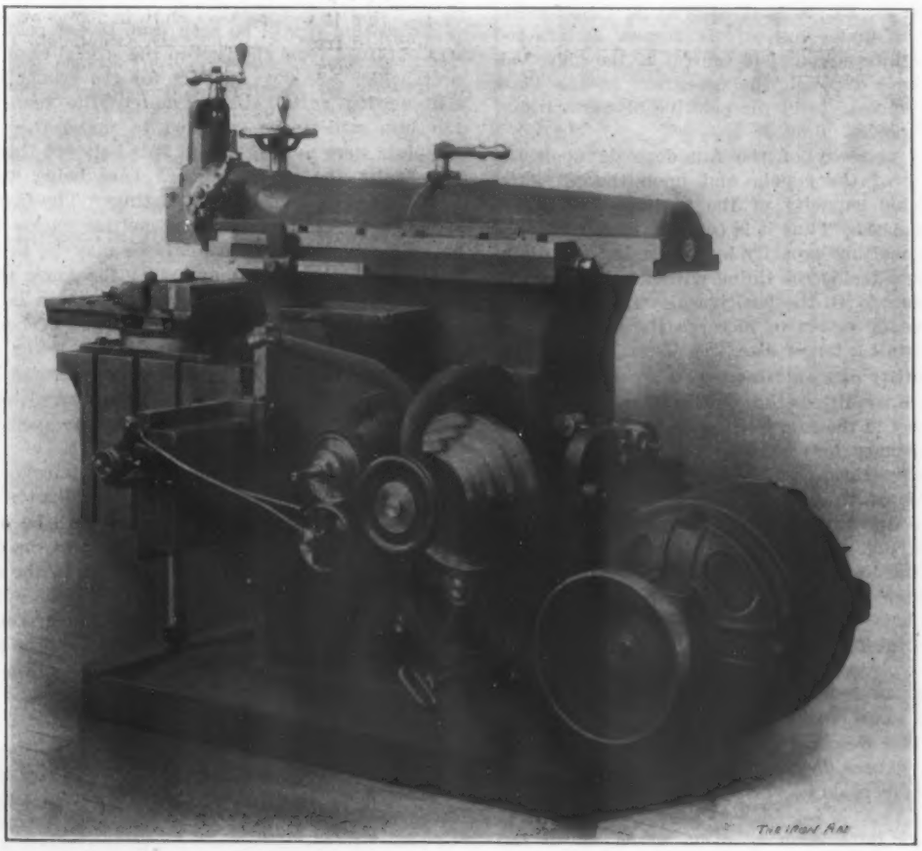
A motor application to a 24-inch back geared crank shaper, similar to the one illustrated, is now being exhibited at the Liège Exposition, Belgium, by the Cincinnati Shaper Company, Cincinnati, Ohio. To duplicate the equipment almost any constant speed motor might be used, as the machine is capable of eight speeds within itself, covering a range sufficient for almost any line of work. It is particularly worthy of notice that little or no change was made to adapt the machine to electric drive, and yet an admirably unobtrusive disposition of the motor was effected. The only special fixtures are the motor pad and its attachments. An interesting feature in connection with this part is the arrangement for regulating the belt tension.

The gear wheel immediately below the four-step cone pulley is attached to the initial shaft—that is, the one which, in the regular machine, having no back gears, carries the cone pulley. On the back geared machine a pinion on the cone pulley shaft meshes with the large gear on the initial shaft. The small wooden hand wheel on the cone shaft is for adjusting the ram by hand. The rod immediately below the large gear manipulates the back gears in the machine and the curved handle at the side of the machine operates a brake on the inside of the cone pulley. The leaf carrying the motor is hinged at its lower end and is adjustable at its upper end, through the cap and set screws shown, to tighten the belt on the cone pulleys.

As has been stated, the machine is in other respects the standard product of the Cincinnati Shaper Company, being one particularly designed for heavy work. The machine may be used either in single or back geared form, the ratio of the gearing in the one case being six revolutions of the cone shaft to one stroke of the ram, and in the other 26 to 1. An outer support for the table is regularly furnished to give it the stiffness required for heavy cutting. The large opening through the column under the ram allows the key seating of shafting and of similar work up to 4 inches in diameter. The following are the principal dimensions:

Extreme length of stroke	25 inches.
Greatest distance table to ram	16¼ inches.
Vertical travel of table	14 inches.
Horizontal travel of table	26¾ inches.
Feed to head	7¼ inches.
Length of ram bearing in column	36 inches.
Width of ram bearing in column	12 inches.
Weight of machine	4,000 pounds.

The length of the stroke is changed from the working side of the machine, and its position by a hand wheel on top of the ram, and these changes can be made while the machine is in motion or at rest.



A 24-Inch Back Geared Crank Shaper with Motor Drive, Built by the Cincinnati Shaper Company.

The Manhattan Bridge.—Specifications will be completed and proposals will be asked about June 1 by the Department of Bridges, New York, for the superstructure for the new Manhattan Bridge across the East River. This bridge will be somewhat heavier than the Williamsburgh Bridge, which took in all about 50,000 tons, but will be of the same type, though of more ornate design. The first contract to be advertised will cover the towers, cables, stiffening trusses, roadways, &c.; in fact, the entire steel structure from anchorage to anchorage, for which there will be required approximately 45,000 tons of steel. It will be some time before the department will be ready to ask bids for the construction of the approaches to the bridge, as the plans for these have not yet been worked out in detail. It is estimated that about 10,000 tons of steel will be required to construct the approaches, which with the tonnage required for the main structure will aggregate 55,000 tons of steel, 5000 tons more than used in building the Williamsburgh Bridge. The main span of the new bridge will be 1470 feet long and the spans from the towers to the anchorages will be 725 feet in length each. It will be 120 feet wide over all, with a 35-foot roadway and four trolley tracks, over which will be the four tracks for elevated service. There will also be two footwalks.

Air Blast for the Foundry Cupola.*

BY W. H. CARRIER.

The foundryman about to install a blower for a cupola wishes to weigh carefully the relative merits of the fan and the positive blowers. The points to be considered in order of their importance are the relative advantages in operation; the relative efficiency—*i. e.*, the relative power required for operation; the relative costs of maintenance, and the comparative first cost.

Operating Advantages of a Fan.

These two types of blowers operate upon different principles. The centrifugal blower furnishes variable air volume at constant pressure, while the positive blower furnishes constant volume at variable pressure. Which is best is still disputed among foundrymen. Some urge that a positive air volume gives a greater speed of melting with less power for a given pressure. Others claim that the fan is more elastic in its operation, giving a greater volume of air when most needed—at the beginning and at the end of the heat—and at no time forcing the cupola to an undue extent. It is also maintained that the fan permits a complete control of the blast volume and pressure through the operation of the blast gate, which is impossible in the positive blower without great waste of power.

The melting capacity of the fan depends upon the inside diameter of the cupola and upon the pressure, while the melting capacity of the positive blower depends upon the speed. Thus it is common in fan practice to increase the melting capacity by increasing the diameter of the cupola inside the lining without changing the speed of the fan. With the positive blower, however, it would be necessary either to increase the speed of the blower or to install a larger size.

Flexibility of Fan Blast Saves Power.

Under certain conditions the positive blower is superior in power economy to the fan. Neither is mechanically perfect. In the former loss of power and of air volume occurs principally through leakage of air between the contact surfaces of the rotary parts. There is considerable loss also due to the friction of the contact parts and of the gearing. The loss in power in the fan is due chiefly to the loss in pressure by friction of the air in passing through the blower. A new positive blower in good condition will give an efficiency of from 70 to 75 per cent., while the fan as usually constructed gives only 60 to 65 per cent. At a slightly increased cost fans can be built giving not less than 70 per cent. efficiency, or practically the same efficiency as obtained by the positive blower. The wearing of the contact parts in the positive blower causes decrease in the efficiency, so that after some years' service its efficiency is frequently lower than that of the fan.

An erroneous impression is often given as to the power required for fan blast, as very often fans are not properly proportioned for the duty required. A fan's efficiency decreases when the fan is worked above or below its rated capacity, although the change in power is not as great as with the positive blower. With the latter the power varies with the pressure, while with the fan the air volume and the power vary inversely as the pressure. Consequently a fan frequently requires excessive power when proper attention is not given to the regulation of the blast, especially when starting the cupola or blowing upon the fire, and also toward the end of the heat when the bed of fuel becomes light. This subject was discussed by Thomas D. West in a paper read before the Pittsburgh Foundrymen's Association, March 7, 1904. The great amount of power used by the fan which he mentions was required when blowing up the fire before charging the cupola. Under such conditions the power required is two or three times that necessary normally. As a motor was used the speed of the blower could not be changed, and the power should have been reduced by the use of a blast gate. A cupola fan requires approximately seven times as much power when blowing freely into the atmosphere as when operated at the same speed with the outlet closed.

* Abstract of a paper presented before the Buffalo Foundrymen's Association April 18, 1905.

Lower Pressures Favored.

The writer believes the practice to be growing in favor among foundrymen of using lower pressures and larger tuyere area, with a better distribution of blast. Under these conditions the advantages lie mainly with the fan. As a comparison, a local foundry using a positive blower on a 60-inch cupola at 16½ ounces pressure requires 3 horse-power per ton of iron melted per hour, while in another case a fan operating a 66-inch cupola requires 2¼ horse-power per ton of iron melted. The blower and fan were both new. It is also interesting to note that the former requires a ratio of 8 to 1 for melting, while the latter requires a ratio of only 10 to 1. The reason for this difference in melting ratio is shown, in part, by a comparison of the analyses of the cupola gases, which were as follows:

	First cupola. Per cent.	Second cupola. Per cent.
Carbon dioxide	11.5	15.1
Carbon monoxide	11.4	8.7
Oxygen	0.5	0.3
Nitrogen	76.6	75.2
Pounds of air per pound of carbon	8.9	9.4
Heat units per pound of carbon	9,200.	10,000

From this it will be seen that 15 per cent. more heat was obtained from the fuel in the second case than in the first, which accounts in part for the economy shown by the melting ratio. Unfortunately the temperatures of the iron which are required to make the above data complete were not taken, but it is believed that they were practically the same, in each case being sufficient for pouring a good grade of fine castings. The fact that there is a greater difference in the melting ratios than would be indicated by the gas analyses may be accounted for by the hypothesis that owing to the more uniform distribution of the blast at a lower pressure in the second case there was a greater concentration of heat and consequently a higher temperature in the lower part of the melting zone, while in the first instance, with less perfect distribution of blast and with higher velocities, the melting zone was more extended and the temperature in the lower part less intense.

The combustion in the cupola is always imperfect. A large volume of carbon monoxide indicates a waste of fuel and a lowered temperature. It will be noticed that the combustion is much more complete in the second case than in the first. This may be because in the second case a center tuyere cupola was used, which, with the low pressure, gave a very even distribution of the blast. It would appear that the proper distribution of the blast is the most important feature of cupola operation and affects the economy of fuel, the time of melting and the horse-power required in furnishing blast.

Melting Capacity.

A question of much importance is the melting capacity of various sizes of cupolas under different pressures and the corresponding horse-powers required for operation. As the result of numerous tests and considerable investigation, a relation has been formulated between the size of the cupola, the pressure of the blast, the average speed of melting and the horse-power required for operation. This data is given in the accompanying tables:

Cupola Capacities.

Diameter of cupola. Inches.		Static pressure at cupola in ounces per square inch. 10 ounces.	12 ounces.	14 ounces.	16 ounces.
30	Cap.	5,690	6,230	6,730	7,200
	A. P. M.	1,423	1,568	1,688	1,800
	H. P.	7.4	9.7	12.3	15.0
35	Cap.	7,740	8,480	9,170	9,800
	A. P. M.	1,935	2,120	2,293	2,450
	H. P.	10.0	13.2	16.7	20.4
40	Cap.	10,120	11,080	11,970	12,800
	A. P. M.	2,530	2,770	2,993	3,200
	H. P.	13.2	17.3	21.8	26.6
45	Cap.	12,810	14,030	15,150	16,200
	A. P. M.	3,203	3,508	3,788	4,050
	H. P.	16.7	21.9	27.6	33.7
50	Cap.	15,810	17,320	18,700	20,000
	A. P. M.	3,953	4,330	4,675	5,000
	H. P.	20.6	27.0	34.0	41.6
55	Cap.	19,130	20,960	22,640	24,200
	A. P. M.	4,783	5,240	5,660	6,050
	H. P.	24.9	32.7	41.2	50.3
60	Cap.	22,770	24,940	26,940	28,800
	A. P. M.	5,693	6 235	6,735	7,200
	H. P.	29.6	38.9	49.0	59.9
65	Cap.	26,730	29,270	31,620	33,800
	A. P. M.	6,683	7,318	7,905	8,450
	H. P.	34.8	45.7	57.5	70.3
70	Cap.	30,990	33,950	36,670	39,200
	A. P. M.	7,748	8,488	9,168	9,800
	H. P.	40.3	52.9	66.7	81.5

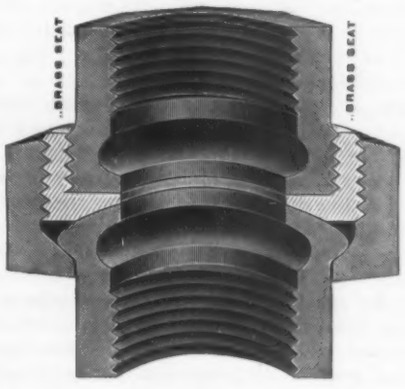
The diameter of the cupola given is measured inside the lining. The Cap. stands for capacity, and is given in pounds of iron per hour; A. P. M. indicates the cubic feet of air per minute required; H. P. stands for horse-power required for driving the fan. It should be noticed that the melting capacity increases at a much lower rate than the pressure, while the horse-power increases very rapidly with the increase in the speed of melting. For instance: A cupola 60 inches inside the lining will melt on an average 11½ tons per hour at 10-ounce pressure with 29½ horse-power. The same cupola requires 16-ounce pressure and 60 horse-power to melt 12½ tons per hour.

Compounded Blowers.

Some very interesting experiments have recently been made in the compounding of blowers for higher pressures. The Buffalo Forge Company is now constructing a compound blower which gives 2 pounds pressure per square inch. It has been found by tests that the efficiency of the blower is not affected by the pressure, so theoretically there is no limit to the pressure that may be secured. By sufficient compounding, a fan could be used as a substitute for an air compressor or blowing engine and an efficiency as high as 70 per cent. be secured. It is probable that great progress will be made in this direction within the next few years by the use of compound fans direct connected to steam turbines.

The Imico Union for Steam Piping.

A new form of union that has malleable iron tail or end pieces in connection with a brass seat has recently been brought out by the Illinois Malleable Iron Company, 30 West Monroe street, Chicago. It is a patented article, to which the company has given the trade name Imico. The particular merit claimed for the union is that, having brass against iron in the seat and brass against iron in the ring, the connection is always noncorrosive and no gasket is required. It is made of malleable iron, as stated, of remarkably heavy proportions, and is of octagonal pattern with interchangeable parts. On account of the strength and durability with which it is



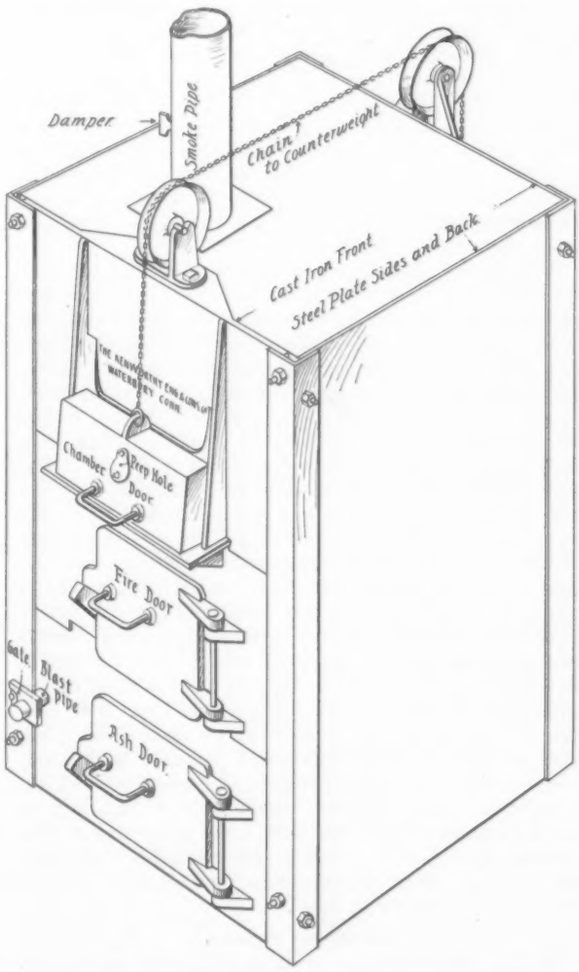
The Imico Union Coupling for Steam Piping.

credited it is particularly well adapted to high steam pressures, such as are in vogue in the power plants of industrial establishments.

Statistics recently received by the New York State Department of Labor shows that only three foreign countries have as many organized working people as New York State, and in proportion to population New York leads even these. Members of labor unions in Great Britain and Ireland number 1,902,308; in Germany, 1,276,831; in France, 715,576, and in New York, 400,000. The ratio is 1 to 18 inhabitants in New York, 1 to 22 in Great Britain, 1 to 44 in Germany, 1 to 53 in France. "It is a significant fact," says the Department, "that the hours of labor are short or long in almost the precise ratio of the degree of organization."

The Kenworthy Hardening and Tempering Furnace.

The illustration shows a new furnace for hardening, tempering, annealing or case hardening with coal fuel in locations where oil or gas fuels are undesirable or not



A Coal Burning Furnace for Hardening, Tempering and Annealing, Built by the Kenworthy Engineering & Construction Company, Waterbury, Conn.

easily obtained. It is made by the Kenworthy Engineering & Construction Company, Waterbury, Conn., and is substantially designed to withstand long and severe service. From the illustration it will be seen that the exterior is of simple construction, and the same is true of the interior parts. The lining is chiefly of bricks of the common sizes. The work is protected from the direct action of the flames by a grooved tile floor, the gases entering the heating chamber at the rear of the work and passing out near the front. This insures even heating and economical use of fuel. When the work is of such a nature that all contact with the flames must be prevented a muffle may be easily placed in the heating chamber.

The front of the furnace is covered with cast iron plates and the sides and back with steel plates. Being built entirely above the floor, the furnace may be placed where most convenient, even on a wooden floor, by putting a plate beneath it, and when so built it may be moved intact. The thickness of the furnace walls adapts it for use in machine shops and other places where excessive radiation of heat would be undesirable. The smoke pipe connection is made with ordinary heavy stove pipe.

The Kenworthy furnace is built in three sizes. The smallest will accommodate work of a maximum size of 13 inches wide, 6 inches high and 16 inches long. The other sizes are for work 17½ inches wide by 7½ inches high, and 22 inches wide by 10 inches high, with lengths up to 35 inches.

Phenomena of Machine Operation.*

BY JOHN RICHARDS, MEMBER OF THE TECHNICAL SOCIETY OF THE PACIFIC COAST.

Among the many agencies and means that contribute to the evolution and better performance of machines and determine their endurance and economy of construction there is one, sometimes ignored and in all cases underrated—the phenomena of their operation—that part which is not computable or learned by rules. This factor, element or condition, whatever it may be called, however strongly it may assert itself in result, is not regularly recognized in the engineering literature of our day; and the object of the present short essay is to urge its claim and importance upon those who are called upon to deal with machine problems.

To present the subject in a practical way, I have chosen the only means that seems available when considering things not computable—that is, by citation of observed facts—and I shall refer to some typical examples. First among these may be mentioned the evolution of apparatus to impel fluids, especially liquids, by centrifugal force. This is seemingly one of the most simple of all means for creating pressure. A body of liquid, confined in a fixed circular chamber, or contained in a revoluble circular vessel, can be set in revolution without other resistance than friction, and this can be reduced to a very low degree in vessels that revolve with the liquid they contain, creating almost unlimited centrifugal tension; but the removal of the liquid from the vessel, or chamber, or its discharge, and the translation of its rotary energy into pressure involve various mechanical impediments, so that the art has been in evolution for half a century past. This process engaged the attention of the celebrated French engineer, Emil Bourdon, who constructed machines that worked up to high water pressure—more than 1000 pounds per inch, it is claimed. Some work in the same direction has been done within a few years past here in California, both with liquids and with elastic fluids, but with what particular results I am not able to say. I mention the method as one phase in the evolution of centrifugal apparatus that may in future have some importance.

Centrifugal Pumps.

During the latter half of the past century, which covers practically the development of the common forms of centrifugal pumps, in which the fluid is set in revolution in a fixed chamber or casing, we have had a maze of computations by eminent scientific men bearing upon the construction and operation of such machines; but, so far as I am aware, no clear or correct explanation of the phenomena of their operation or of the varied conditions of their use. Such computations as we have were naturally based upon certain assumed premises derived from obvious hydraulic laws, and to some extent from experiments; but these latter have not been of a kind to disclose what we call the principle or mode of action, including the whole passage of liquid through the machines. The main resistances that qualify effect were sought out and shortened into formulæ, which are in the main correct. Arrangements and proportions were based upon such formulated data, and 50 years have since passed with progress, but without providing a clear concept and treatment of what has been called the phenomena of operation. Strange to say, the impediment was confined almost wholly to the simple matter of returning the water, after its rotation, to a state of rest or service flow, without a loss of the kinetic energy required to set the water in revolution.

That there was a good deal of mystery in this matter is sufficiently proved by the fact that a great share of the literature relating to such pumps has been devoted to the shape of the impelling vanes, a thing which modern practice shows to be of no importance and almost a negligible matter in constructive design. The function of such vanes is to set the water in revolution, and is but little more, except as to a slight modification of frictional resistance. The body of confined water in revolution is the thing to be considered. The vanes, except as to the function named, are merely a portion of the mass in revolution, moving at a rate relatively which renders their shape and curves a matter of little importance. It should have been obvious that the only considerable loss of energy took place in the zone between the impellers and the collecting or discharge chambers.

The most successful attempt at preserving or utilizing the kinetic energy of the water's revolution was made a few years ago by Sulzer Brothers of Switzerland, who introduced separating vanes in the dispersion zone of centrifugal pumps to divide the water into distinct divergent streams and to preserve it from agitation until its energy was translated into pressure. To accomplish this the dispersion passages had to begin with an area that would collectively vent a particular volume of water at the velocity required to balance the head or resistance. Such construction, when the castings and internal surfaces were true and tolerably smooth, increased the efficiency of such pumps for the higher pressures about 10 per cent. or more, compared to those without a dispersion zone or when the water is discharged from the impeller directly into a collecting chamber; but at the same time it set up impediments and limitations of a very formidable kind. The castings are difficult to make; the acute points of the dispersion vanes wear away; but. most of all, the pumps have to be driven at an invariable speed and to deliver a specific volume of water in order to gain this higher efficiency. There is also a very considerable increase in dimensions and in cost of construction, and it remains to be seen whether a satisfactory efficiency cannot be attained without encountering these impediments.

We are in no position to know the value of divided water passages in the dispersion zones of such pumps until the cause of losses there is understood. A mass of water moving at high velocity is easily disturbed and broken up into devious currents and courses, especially when the water is moving in a circular path, and it is easy to conceive that rough cast surfaces and imperfect shape of the discharge way produced the principal loss in an open discharge zone. Computation furnishes no clue to this matter. The future will no doubt determine this, not suddenly or as a discovery, perhaps, but by a careful study of the construction and adaptation of such pumps to the theoretical and also the practical conditions of design.

To make a theoretical centrifugal pump from computed data is quite a simple matter. A diagram to cover or include the water passages through a pump, with a cross section as the volume and inversely as the velocity, the length of the diagram representing the acceleration and retardation of flow, will disclose a design theoretically correct, and would only require that such a diagram be surrounded by a confining chamber of sufficient strength. In practice, however, such a scheme would fail. Every pump would become a special machine for a specific volume and head; contraction of the water passages would prevent the passage of solids, except those of small size; the disturbance by the roughness of interior surfaces and divergence of course would interrupt and modify the velocity of flow; the machines could not be cheaply produced by the implements of organized manufacture, they would fail to meet the diversities of use, and the cost would far exceed the commercial standards that now prevail.

The conditions of practical use demand that pumps be made within certain limits for both high and low pressures, or with a considerable range of adaptation to different pressures; they have to be employed for various liquids, pure and impure, viscous and corrosive, and to pass solids of various kinds, including sand and gravel. They must endure abrasive scour in their water passages and exposure of their journal bearings, and they must provide against unequal pressure or lateral thrust on the impellers. Interior surfaces, where the velocity is great, should be in true contour and finished smooth, with other features which could be named and which lie wholly outside of what we may call a computed or theoretical construction.

* Abstract from the *Journal of the Association of Engineering Societies*, March, 1905. A paper presented before the Technical Society of the Pacific Coast.

Turbine Water Wheels.

I have reverted at some length to centrifugal pumping, but the like circumstances apply to nearly all fluid machines, which as a class have received the highest possible scientific treatment. For another example, turbine water wheels were made the subject of research by eminent French engineers, who previous to the middle of the past century, commissioned and aided by their Government, laid down laws and scientific rules to govern the construction of these important machines. It was no doubt the most thorough and successful attempt of the kind ever made, and produced the three types of turbine water wheels known as the Fourneyron, or outward flow, the Jonval, or parallel flow, and the partial turbines or impulse wheels of Girard. About 1850 the subject was taken up in this country by two American engineers, Boyden and Francis, who constructed at Lowell, Mass., what have remained to the present time the finest examples of Fourneyron turbines on this continent. Emil Geyelin, a French engineer, came a little later to Philadelphia and introduced the Jonval type of turbines. The Girard type, or partial turbines, have not been successfully exploited in this country, if we except the wheels lately erected at Niagara Falls.

Here was a complete mathematical development of water turbines carried out to a skilled construction and to operate at the greatest efficiency. The subject of the water turbine seemed ended, and so it was in so far as efficiency was concerned; but there was another phase to be dealt with in the operating conditions. The French turbines were refined machines, exact, expensive and adapted for pure water. Our streams are mostly in flat lands, fluctuating and turbid. Gravel, driftwood and other kinds of *débris* would not pass through the fine issues of the new turbines, and American mechanics began in an experimental way developing new models. In the French wheels the finished and expensive running elements were outside and occupied the extreme diameter, while the rough and inexpensive fixed elements were placed internally and were of relatively small diameter. This resulted in expensive construction and a slow rate of revolution, requiring strong and expensive gearing for transmission. So accustomed were engineers to associate centrifugal effect with turbines that radial or outward flow seemed an essential condition, when, in fact, it had little to do with the case, as was later found out by experiment.

The American mechanics after many years succeeded in turning the wheels "inside out," or inverted them, so to speak, making the internal or smaller elements the running part, so that the water flowed inward toward the center, then changed its course 90 degrees downward in helical passages for escape. This was done entirely without scientific aid, in some cases even controverting scientific rules, and the result is the centripetal or inward flow turbine, the standard water wheel of this country, of which a single firm has made more than 10,000, and the wheels have even found ttheir way back to France. Their efficiency is fully equal to or even greater than that of the older types, and the cost of the wheels is about one-half as great. This evolution has required about 60 years, and present practice rests mainly upon observed phenomena and upon the operating conditions rather than upon computed data. There was not even a draftsman in the works where the wheels were made that gained the highest award at the careful trials conducted at the Centennial Exposition in 1876.

In respect to the Girard type, or impulse wheels, Weisbach and others had contemporaneously, or earlier, investigated the laws that govern the effect of impinging fluids, and such laws were carefully observed in the development of partial turbines in Europe, where such wheels are now the standard type for the open or impulse class; but on this coast, mainly by reason of very high heads or pressures and the accurate work required in wheels of this kind, there commenced about 25 years ago a modification suggested by the peculiar operating conditions, producing a new class known as the "tangential" type. The development of this was to a great extent experimental. Notwithstanding that a good deal of scientific data relating to such water wheels was furnished at the beginning by Prof. F. G. Hesse of the University of California, the phenomena of operation continued to be observed, and from various clues modifications were made, down to 1900, when it was discovered that the double buckets could be passed into and out of the stream by once dividing it. Other final features in the design of such wheels were noted also. They have since taken on the dress and finish of proper design and workmanship.

Steam Turbines.

In the case of elastic fluids, impulse motors or steam turbines have been more than a century in evolution, notwithstanding that more than 400 separate patents have been granted in Great Britain alone for inventions pertaining to these machines, some of them a century ago and many of them 50 years ago. Parsons, an eminent English engineer, who has been prominent in this work during later years, is no doubt one of the greatest living adepts in the science of thermodynamics, and as is claimed he has forecast with much accuracy the development of his turbine schemes as they progressed from 48 down to 11 pounds of steam for each horse-power hour, but it is also claimed that he has expended $500,000 in experiments. If inquiry were made, Parsons would probably admit that not one-fourth of his data came from computed sources, and that the observed phenomena of operation and adaptation have comprised the other three-fourths.

Gas and Steam Engines.

I might mention Lenoir's gas engine, the first of the internal combustion class. I examined an old engine in 1870, the first successful one, and I strongly suspect that, aside from the operating phenomena, this machine has furnished suggestions for nearly all improvements since, except perhaps the graduated combustion in the Drayton and Diesel types yet in evolution owing to impediments that arise in construction.

A wider and more important example of evolution in operating phenomena is furnished by piston steam engines. I do not mean the thermodynamic development of these, which is the greater part, furnished mainly by scientific deduction and experiment, but to the mechanical evolution of their operating parts, which had to keep pace with the thermal problems. The "elimination of the speed factor," as George W. Dickie calls it, not only in the rotative but also in the reciprocating parts of such engines is a wonderful example of experimental development. Down to 25 years ago it was a common object in steam engine design to reduce surface and velocity in bearings, partly to avoid friction and partly because reduction of weight and space were also incentives, but the operating phenomena of machine bearings was a mystery in so far as any scientific rules were available. Forty years after the publication of General Morin's experiments, which established a generally accepted law of friction, we find that alignment and pressure were considered subordinate when compared with surface in bearings.

Alignment, or the fit of bearing surfaces, especially in the case of cranks, is yet a mystery, if considered in a practical way. The most careful computations respecting the flexure of shafts, frames, crank disks and pins fail to disclose the operating phenomena. One has only to observe the center of an overhung crank or disk, even of the strongest proportions, to see that it describes a visible ellipse when under heavy strain and for reasons not explainable by computation. French makers of steam engines so dread this phenomena that, I believe, none of them employ overhung cranks. Similarly obscure operating conditions exist in various other parts of steam engines, and proportions are beyond question based more upon observed operating phenomena than upon computed dimensions.

Theoretical Apparent Inconsistencies.

Bearings that operate under steam, slide valves, for example, were scraped to a perfect fit; cylinders were bored out with a smooth, glistening surface under a belief that such fitting was theoretically correct, but, by accident mainly, it was found that the bearing surfaces performed much better when they were not smooth and in perfect contact. A film of interposed water or oil produced the uniform fit. In crushing hard material, such

as quartz, with metallic surfaces, it was naturally inferred that the metal opposed to the stone should be as hard as possible, but for reasons not easy to explain soft metal endures longest. Cornish rollers are now covered with rings or tires of soft, fibrous iron. The sand blast discloses a like phenomenon. It is easier to bore a hole through a file with the sand jet than through a thin sheet of copper. An emery wheel will rapidly cut away tempered steel, but not soft iron. It is a problem of friability no doubt, but is not fully explained. The whole field of mechanics is full of unexplained phenomena and mysteries, such as the temper of steel, the fatigue of metals, their crystallization under rhythmic concussion, the inherent strains in molded steel, the surge and reaction of moving liquids under high pressure.

The purpose of this paper is to call attention to the fact that the conditions of actual practice are often best met not by machines figured out and determined on a drafting board from scientific data and thus produced with exactness and success, but rather by such as have come to us through the long line of evolution and have been developed mainly by other means than computation. Much that is written is apt to lead to the conclusion that scientific calculation alone suffices in machine design without the exercise of logical reasoning and practical observation of the operating phenomena and the conditions of use. Academic institutions should at least temper their theoretical instructions with the required warning that the phenomena of the operation of machines must be a principal factor in their successful evolution.

Shipbuilding for Foreign Account.

An Important Drawback Issue Raised.

WASHINGTON, D. C., May 2, 1905.—The General Electric Company has raised an issue with the Treasury Department, that has been referred to the Attorney-General for an opinion, as to the right of a domestic manufacturer to secure drawback on imported materials used by him in the manufacture of articles employed in the construction and equipment of vessels built for foreign account. The case is one of far reaching importance to all tidewater shipbuilders, as well as to subcontractors on all vessels built for foreign ownership.

In the case in question the General Electric Company imported four mirrors which they employed in the manufacture of searchlights for the equipment of the cruiser Kasagi, built for the Japanese Government by the Cramps at Philadelphia. The importation of these mirrors is certified to in due form by the customs officials at the port of New York, the certificate showing that duties at the rate of 45 per cent. on a valuation of $926 were paid thereon. A supplementary certificate is also attached addressed to the surveyor and signed by the inspecting officer, stating in effect that the searchlights in the manufacture of which the mirrors were used entered into the construction and equipment of the cruiser. The right to drawback is based on Section 17 of the act of June 26, 1884, which reads as follows:

When a vessel is built in the United States for foreign account, wholly or partly of foreign materials on which import duties have been paid, there shall be allowed on such vessel, when exported, a drawback equal in amount to the duty paid on such materials, to be ascertained under such regulations as may be prescribed by the Secretary of the Treasury. Ten per centum of the amount of such drawback as allowed shall, however, be retained for the use of the United States by the collector paying the same.

This statute has not been specifically repealed by Congress, but in the tariff act of 1897 a section was included providing for the importation, free of duty, of foreign articles intended for use in the construction and equipment of vessels built in the United States for foreign account and ownership and for the foreign trade, as follows:

Section 12. That all materials of foreign production which may be necessary for the construction of vessels built in the United States for foreign account and ownership, or for the purpose of being employed in the foreign trade, including the trade between the Atlantic and Pacific ports of the United States, and all such materials necessary for the building of their machinery and all articles necessary for their outfit and equipment may be imported in bond under such regulations as the Secretary of the Treasury may prescribe, and upon proof that such materials have been used for such purposes no duties shall be paid thereon. But vessels receiving the benefit of this section shall not be allowed to engage in the coastwise trade of the United States more than two months in any one year except upon the payment to the United States of the duties of which a rebate is herein allowed: Provided, That vessels built in the United States for foreign account and ownership shall not be allowed to engage in the coastwise trade of the United States.

Competition with Foreigners.

In urging its claim upon the attention of the Department the General Electric Company contends that as American manufacturers offer their products made from imported dutiable materials to American shipyards building for foreign account and ownership in competition with like foreign products admitted free under Section 12, it was the intention of Congress that such domestic manufacturers should not be discriminated against in competing for that trade, and hence that it was not intended that Section 12 of the tariff act should supersede Section 17 of the act of 1884 above quoted, but was intended to grant another privilege to American shipbuilders irrespective of the concession already made in the prior act.

It is further contended that since Section 17 of the act of 1884 was not specifically repealed by Congress it was in effect re-enacted from time to time by Sections 25, 22 and 30 of the tariff acts of 1890, 1894 and 1897, respectively, which provided among other things that "the drawback on any article allowed under existing law shall be continued at the rate herein provided." The drawback under the act of 1884 was at the rate of 90 per cent. of the duties paid, but under the tariff act of 1897 the rate was increased to 99 per cent., and it is therefore argued that the phrase "at the rate herein provided" was intended to increase the allowance under the terms of the act of 1884 to 99 per cent., and that the earlier statute was neither repealed nor amended in any other respect by the later enactments. It is, therefore, claimed not only that drawback should be allowed on the mirrors under the act of 1884, but that the rate of allowance should be that provided by the existing tariff act—namely, 99 per cent. of the duties paid.

The Treasury Department, after considering this claim, rejected it on the ground that the act of 1884 was repealed by Section 12 of the present tariff law, basing this rejection upon the same considerations that moved it to deny the application of the Shelby Steel Tube Company of Cleveland, Ohio, for drawback of duty paid on imported Swedish billets used in the manufacture of boiler tubes employed in the construction of boilers for two Russian battle ships built by the Cramps in 1899. The result of the decision in the Shelby Steel Tube Company's case has been that domestic manufacturers who have been compelled to import their material and pay duty thereon have been refused drawback of such duties when their products have been sold to American shipbuilders for use in the construction of vessels built for foreign account. On the other hand, their foreign competitors, who either secure their materials free of duty or are paid a drawback by their Governments when their goods are shipped to the United States, have been able to sell to the American shipbuilder on an absolutely duty free basis.

Attorney-General to Decide.

The Treasury officials freely admit the equities in the case presented by the General Electric Company and, therefore, they have decided to reconsider the adverse action taken and to refer the matter to the Attorney-General for an opinion. In this opinion it is probable that the Attorney-General will not only discuss the question as to whether the act of 1884 has been repealed by the Dingley tariff act, but also the issue as to whether a war vessel built in the United States for a foreign government and delivered at a foreign port can be said to have been "exported" within the meaning of the drawback law. The court decisions in which this question has been touched upon are against such a construction of the term "exported," but they have related to vessels belonging to private individuals, which occupy a somewhat different status from that of a foreign war ship, as to which in certain cases the principle of extra territoriality has been held to apply. W. L. C.

The Laffitte Welding Plate.

For a number of years there has been in successful use in France the Laffitte welding plate employed for the welding of iron and steel. It is now being introduced in this country by F. R. Phillips & Sons Company, Pennsylvania Building, Philadelphia.

The plate consists of wire gauze which is the carrier of a compound of borax, iron filings, &c. It is marketed in the form of plates 4 x 8 inches, which are divided

Fig. 1.—The Laffitte Welding Plate Used in Welding Two Cold Chisels.

by channels into 162 squares. When the pieces to be welded have been properly heated the welding plate is placed upon the heated surface, light blows of the hammer making the contact perfect. The borax melts and clears the surface of the weld, borax flowing from the channels formed by the squares, leaving the two welding surfaces to be united by the metallic skeleton of the wire gauze and by the filings incorporated in the

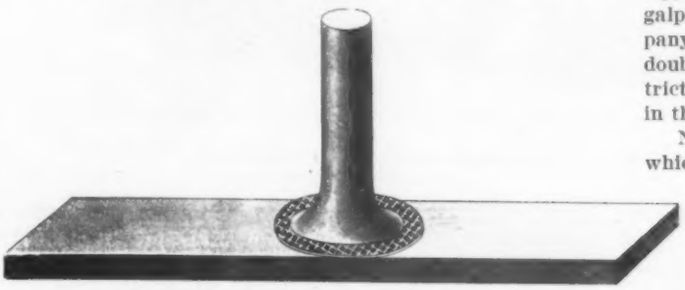


Fig. 2.—The Laffitte Welding Plate Used in Welding a Stud to a Steel Bar.

borax. In this manner the welding is greatly facilitated and rendered secure. The division of the plate into squares makes it possible also to break off from the plates the exact size to be used for each weld. The manner in which the operation is carried out is shown in the accompanying engravings, Fig. 1 showing the introduction of the welding plate between two cold chisels.

Quite a number of elaborate tests have been made to show the mechanical properties of the welded

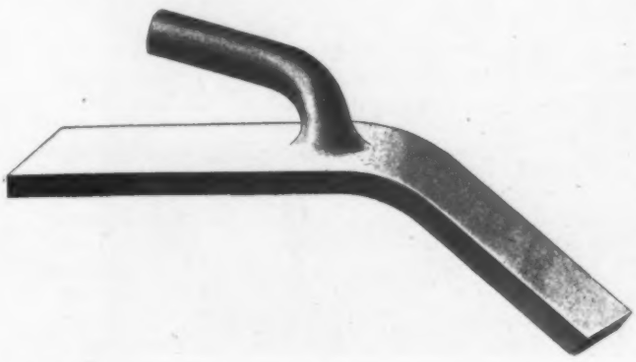


Fig. 3.—Bending Test of the Stud and Bar After Being Welded as Shown in Fig. 2.

articles, as compared with the tensile strength and elongation before welding, the records being accompanied by analyses of the steel used. These records show that with the softer steels the mechanical properties are almost unimpaired. In the case of the higher carbon steels there is a slight lowering in the tensile strength and in the elongation. In the case of the steel having 1.35 manganese, 0.45 carbon, 0.045 sulphur, 0.083 phosphorus and 0.08 silicon the tensile strength, which was 7 kg. per square millimeter in the original bar, was reduced to 63.6 and 68.0 kg. per square millimeter, while the elongation declined from 15.2 to 10 and to 11.6. Welding by the ordinary method showed a tensile strength of 55.9 kg. and an elongation of 2.5 per cent.

A somewhat complicated weld is shown in Fig. 2, a stud being welded by the welding plate to a steel bar. A subsequent bending test of the stud and of the bar is shown in Fig. 3, no indication of any rupture in the weld being brought out.

The F. R. Phillips & Sons Company has carried out some interesting welding tests with 2 per cent. carbon steel. The smith first annealed the material and secured a perfect joint. In ordinary crucible steel it is not even necessary to anneal.

The welding plates have been thoroughly tested in this country, and are now in use by a number of leading railroads, shipbuilding firms and machinery builders.

Central American Notes.

SAN JOSÉ, C. A., April 24, 1905.—Matagalpa is one of the most prosperous sections of Central America. This is greatly due to the fact that coffee can be raised cheaper and in greater quantity to the Caballeria. The planters can count on the Indian laborers in the surrounding country, and as soon as the new line of railroad from Matagalpa to the Capital is completed by the American company from California, the production will easily be doubted. So far there is but little machinery in this district, most of it being the mills for the sugar plantations in the surrounding country.

News comes of the great prosperity in Argentina, which claims a foreign commerce of over $450,000,000 last year. Germany, England and France get about 75 per cent. of this trade, while the United States gets scarcely 15 per cent. Of the total imports Argentina gets over $40,000,000 in steel, iron and machinery, of which the United States sent out only about one-fiftieth. There scarcely seems to be a good reason for this condition of our trade. Here we have a prosperous and generally peaceable country, where business methods are generally understood and practiced. It is true that our lines of communication are bad, whereas Britain, Germany, France and Italy have direct lines of steamers running semimonthly, and often weekly, to say nothing of hundreds of tramp steamers and the regular sailing trade.

The large number of laborers put on the canal work at Panama is making things hum, and the entire Pacific Coast is extolling President Roosevelt and Secretary Taft for trying their utmost to increase American trade by putting on fair rates of freight on the Panama-Colon Railroad and getting another line of steamers under way. This farseeing policy will surely bring the Compañia Chilena and the Navigation Company's steamers up the coast to San Francisco, and the Kirstner or Kosmo liners on the Magellan route. The above will practically take in the trade of Guatemala and Chiapas to Panama, including intermediate ports, then southward, including Colombia, Ecuador, Peru, Bolivia and Chile.

If Colombia is successful in floating her foreign loan she will build from the Pacific to the heart of the Andes, reaching the rich high tablelands in and about the capital, Bogotá. Here is found a virgin country many times richer than the Philippines, with a cool climate the year round. C.

The annual meeting of the Tennessee Coal, Iron & Railroad Company was held May 2 at Tracy City, Tenn. Two new directors, Andrew W. Smith and John E. Borne, take the places of Joseph B. Dickson and Charles McCreary, resigned. The directorate is now made up as follows: Don H. Bacon, William Barbour, Albert B. Boardman, Henry R. Sloat, J. Henry Smith, F. S. Witherbee, John E. Borne, Andrew W. Smith, Herman S. Leroy, Cord Meyer, S. L. Schoonmaker, Benjamin F. Tracy and James T. Woodward. The board will meet about the middle of the month to organize.

Laidlaw-Dunn-Gordon Gas and Electric Driven Air Compressors.

The direct driving of electric generators and many other classes of machinery has become quite common, but it has not been usual to see air compressors, except in the direct acting steam driven form, operated other than by belt connection or gearing. Two direct connected air compressors have lately been built by the Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio, one receiving its power from a gas engine and the other from an electric motor. The first, shown in Fig. 1, is a double end two-stage compressor driven directly by a gas engine running 170 revolutions per minute, and the second, shown in Fig. 2, was built for the General Electric Company to be driven by a 150 horse-power motor.

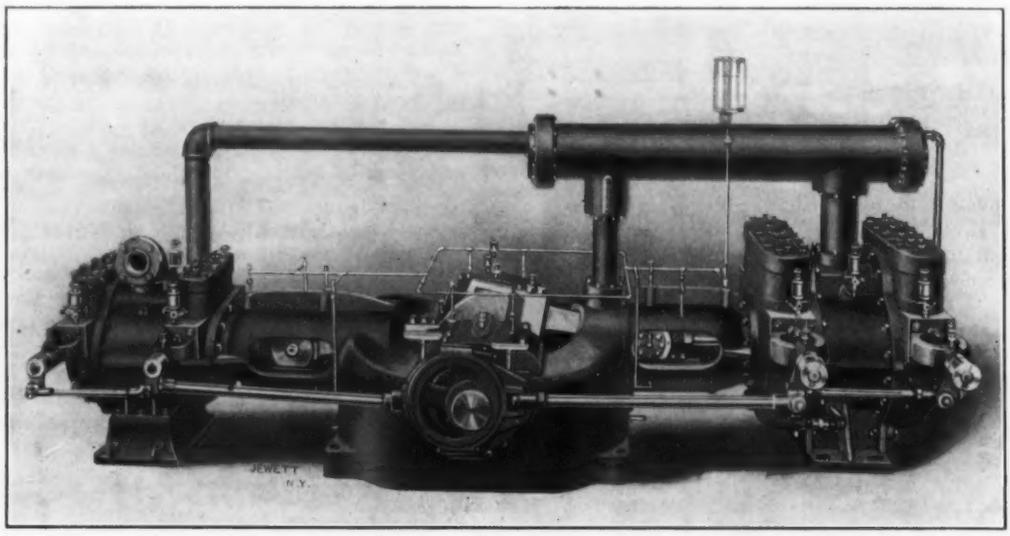


Fig. 1.—Crossley Gas Engine Direct Connected to Laidlaw-Dunn-Gordon Air Compressor.

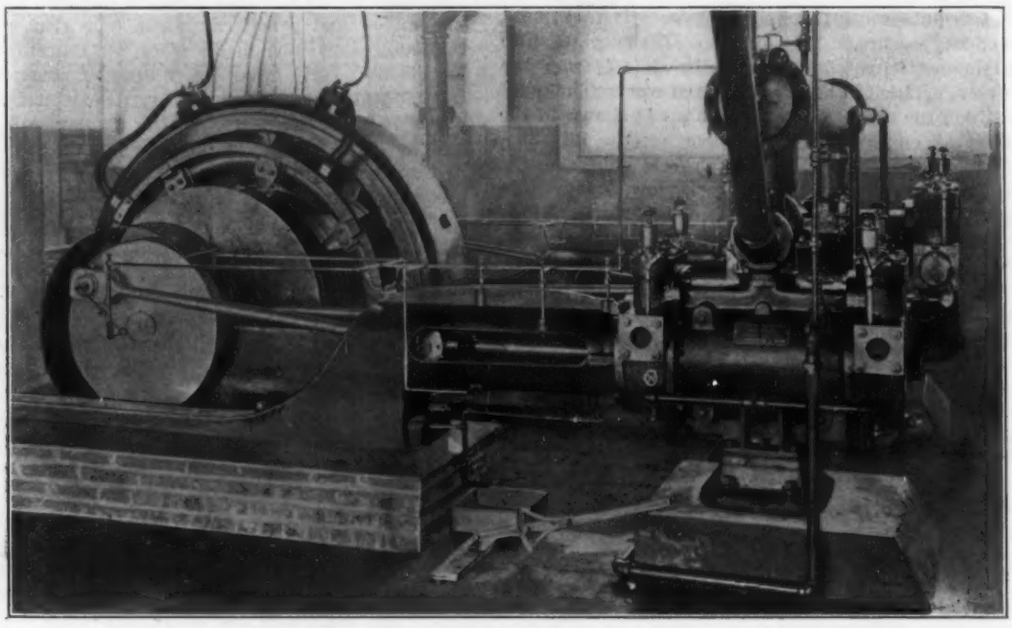


Fig. 2.—General Electric Motor Direct Connected to Laidlaw-Dunn-Gordon Air Compressor.

The air cylinders of the gas driven machine are 21 and 12 inches in diameter by 12 inches stroke, giving a displacement of 810 cubic feet of air per minute against a pressure of 100 pounds. The prime mover is a 150 horse-power Crossley gas engine, manufactured by the Power & Mining Machinery Company, New York. The type of frame used in this compressor was selected to harmonize with the design of the Crossley engine and to render the outfit more compact than if the ordinary duplex arrangement had been employed. The crank shaft of the compressor is extended on one side and coupled to the gas engine shaft, a heavy fly wheel being placed between the main bearings of the compressor and engine. The cranks of the compressor are set at 90 degrees with each other to equalize the torque.

In the motor driven set the armature of the motor is mounted directly on the compressor shaft. The air cylinders of this machine are 18 and 11 inches in diameter, respectively, with a common stroke of 24 inches, the speed being 120 revolutions per minute, so that a displacement of 850 cubic feet a minute is obtained against a pressure of 100 pounds. The frame construction is of the Laidlaw-Dunn-Gordon standard rolling mill type, the motor being placed directly between the frames.

Both of these machines are fitted with the Cincinnati valve gear, an extended description of which was given in *The Iron Age* of January 21, 1904. The essential feature of this gear is the mechanical closing of the discharge, as well as the mechanical control of both the opening and closing of the suction. This arrangement is claimed to produce quiet action and good efficiency at speeds which would be impossible with the ordinary poppet or semimechanical valve gears. For high compressor speeds means are required for positively controlling these

three constant points in the compression cycle without destroying the flexibility of the machine by also fixing the point of opening of the discharge. For good efficiency the discharge valve must continue to give a fair opening up to the very end of the stroke, and must then close before the return stroke has progressed more than a small fraction of its total length. To prevent serious loss by back blowing, the discharge valve should close in about one-fortieth of the time occupied by a revolution. The Cincinnati gear is claimed to retain the elasticity and simplicity of a poppet discharge opening, the opening of the discharge being the only variable point in the cycle, and at the same time controls mechanically the fixed points of discharge closing and suction opening and closing. This is the reason advanced why these compressors can be directly connected to motors or gas engines having fairly high speeds without sacrificing efficiency.

The Carolina Tin Belt.

Development and Economic Importance of the Deposits.

WASHINGTON, D. C., May 9, 1905.—A report on the tin belt of the Carolinas, based upon a careful reconnoissance made during the fall of 1904 by L. C. Graton and Waldemar Lindgren, has been compiled for the United States Geological Survey. Special attention is given to the development and economic importance of these deposits, which, it is stated, offer a promising field for exploration and which, if systematically and wisely developed, ought to prove of great value. Following is an advance abstract of this interesting report:

Extent of the Belt.

The Carolina tin belt, as at present explored, extends in a northeasterly direction from Gaffney, Cherokee County, S. C., to about 4 miles of Lincolnton, Lincoln County, N. C., a distance of some 35 miles. It lies in the Piedmont Plateau, 30 to 50 miles east of and approximately parallel to the Appalachian Mountains. The tin belt is limited to the occurrence of pegmatite. In most places, so far as at present known, the belt is narrow, comprising one or a few closely spaced dikes. In some localities, however, the number of pegmatite bodies increases, and at times also the distance between them is greater and the belt is wider. This pegmatite belt passes through Gaffney, S. C., northwest of Blacksburg, S. C., just southeast of the towns of Grover and Kings Mountain, N. C., a couple of miles west of Bessemer, N. C., through Long Shoals, N. C., and about 4 miles east of Lincolnton, N. C. It reaches its maximum width of 2 miles not far south of the northern border of Gaston County, N. C. The belt extends about northeast from Gaffney to a little north of the State line, and there turns more nearly northward, corresponding very closely with the axis of the Blacksburg anticline.

The pegmatite masses are called dikes, but they are very irregular. In dip, strike and width individual bodies exhibit great variations. Forking or branching is rather common. Frequently a dike pinches out completely and it is not found again, but sometimes it reappears in the same plane or to one side. These variations take place both horizontally and vertically. The common width of the dike thus far exploited for tin ore is from 2 to 6 feet.

Character of Ores.

There are two varieties of pegmatite. One is composed almost exclusively of quartz and microcline, and, so far as known, carries no tin. It occurs rather commonly in the neighborhood of the Ross mine at Gaffney. The tin bearing variety is particularly characterized by abundant muscovite-mica in large foils, in feathery aggregates or in small, irregular grains mixed with quartz. It is not a lithium bearing species. The amount of quartz varies, but is always considerable. Feldspar is sparingly present and is largely of the plagioclase variety. In general appearance the rock is of light color and of variable grain.

At various places throughout the belt these dikes carry cassiterite, the dioxide of tin. The cassiterite is crystalline, but only rarely has good crystal faces. In a few cases well formed crystals have been found. It occurs from minute grains up to individuals weighing as much as 2 pounds, and aggregates which are almost entirely cassiterite sometimes weigh several hundred pounds. The mineral is usually dark brown to almost black and has a metallic luster. In a few instances it has been found of lighter color. It is very friable, and in consequence often appears to be low in the scale of hardness.

Development Work.

Prospecting in the Carolina tin belt has been carried on more or less continuously since the discovery of tin in the early eighties. Development has naturally been more energetically pursued since the opening of a shipping property. Recent work has been done largely by Mr. Ross of Gaffney, who owns the Ross mine, and by the Carolinas Tin & Development Company of Gaffney. This company controls the Faries mine, south of King's Mountain, and recently sold the Jones mine, 7 miles north of King's Mountain, to the Carolina Tin Company of Charlottesville, Va. The American Sheet & Tin Plate Company did considerable prospecting in the summer of 1904, and Messrs. Carpenter and Rudisill of King's Mountain, N. C., have explored rather extensively from King's Mountain northward into Lincoln County, N. C.

The Ross mine is opened by a shaft 75 feet deep, from the bottom of which a short cross cut intersects the dike. A drift about 25 feet in each direction from the cross cut and a 50-foot incline from the surface follow the ore shoot. Seventy-five thousand pounds of cassiterite, which includes a considerable amount of float ore gathered from the surface, has already been shipped.

The Faries mine has a number of pegmatite dikes, of which one shows at the surface a fairly rich bunch of ore. A shaft near this outcrop is 40 feet deep and has about 200 feet of cross cuts and drifts at its bottom. These developments expose two converging pegmatite dikes, but the ore shoot seen on the surface has not been encountered and work is now suspended.

The Jones mine shows two pegmatite dikes occurring in amphibolite. One is parallel to the foliation of the country rock and dips northwest, but the other is approximately vertical. A shaft 175 feet deep has been sunk on the vertical dike and drifts have been run in both directions at depths of 50 and 100 feet, and shaft and drifts are all in ore. At the 150-foot level a short cross cut to the south encounters some narrow streaks of tin bearing pegmatite parallel to the main dike, but of too low grade to be profitable. A concentrating mill has been erected and nearly a carload of cassiterite is ready for shipment.

While no extended development has been done in the northern part of the area some very encouraging results have been obtained in shallow openings, and that part of the belt appears to be the most promising.

A little cassiterite has been obtained from placers near the Ross and near the Jones mines, but systematic search for stream tin has not been undertaken. In view of the much lower cost of winning placer tin than of mining it from lodes, it seems that this part of the prospecting ought not to be neglected.

Of the second shipment from the Ross mine, comprising nearly 18 tons of ore, analyses by Ledoux & Co. show that about seven-eighths averaged 70.44 per cent. metallic tin, while the remaining portion contained 36.50 per cent., the total shipment thus averaging 66 per cent. metal. This is a very good grade for lode tin. It is possible that ores from other parts of the belt, or other shipments from the same mine, may not equal this figure, but it is to be expected that careful and thorough concentration will result in a product of very good grade.

Conclusions.

The Carolina tin belt appears to offer a promising field for exploration, although present indications are not such as to justify the assumption that it will supply the American market. Some of the developments seem certainly to have demonstrated the existence of considerable ore bodies, which, if systematically and wisely developed, ought to prove valuable. Owing to the irregularity and the uncertainty of extent of the ore bodies, cautious methods of development are recommended. W. L. C.

The Gayley Dry Air Blast.

Supplementary Data.

BY JAMES GAYLEY, NEW YORK CITY.

It is to be regretted that the data respecting the use of dry air blast, which was presented to the Iron and Steel Institute at its meeting in the United States in October, 1904, should have been restricted to the period from August 25 to September 9, inclusive, and from September 17 to 30, inclusive. In order to present the paper at all it was found necessary to limit the record of operations to the period above stated. In the discussion of the paper, it would appear from the conclusions of some participating therein that they have been placed at some disadvantage in considering the economies obtained through the use of dry air blast by reason of the data covering such a short period. It is the purpose of this communication to present in detail the record of operations of the Isabella furnaces from November, 1904, to March, 1905, inclusive, as shown by the furnace records.

The month of October, 1904, is not included, as the furnace using dry air blast was stopped several times for repairs, and while the record was a very good one considering these interruptions, yet it was not a continuous one.

The record for Furnace No. 1, using dry air blast, and the comparison with Furnace No. 3, using natural air, for the month of November, 1904, are as follows:

	Grains of moisture. In atmosphere.		Grains of moisture. In dry blast.		Temperature Degrees F. At-mosphere.		Temperature Degrees F. Dry blast.		Gas analysis.	
Year 1904.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	CO.	CO_2
Average	1.90	1.99	1.03	1.01	46	43	19	20	23.5	13.8
Maximum	2.82	2.75	1.15	1.07	59	59	22	22	...	...
Minimum	0.88	0.90	0.81	0.81	31	29	15	16	...	...

The record of operations is as follows:

	Average daily product.—Tons (2,240 lbs.)	Average coke consumption. Pounds.	Blowing engines. Revolutions per minute.	Aver. temperature hot blast. Degrees F.
No. 1 furnace: Dry air	.447	1,816	96	854
No. 3 furnace: Natural air	.386	2,279	111	750

By a reference to my former paper it will be noted that the month of November is the beginning in this country of the winter period, when the atmosphere decreases rapidly in humidity, the month of October being the transition month in the autumn and April in the spring, and furnaces using natural air approach more closely, from November on, to the conditions obtained by the use of dry air blast. The data given in the first table, with reference to grains of moisture and temperature, represent the average for the day of observations taken hourly during the period indicated. The temperature of the dry blast is from observations taken at the top of refrigerating chamber, but this temperature is increased in the passage of the air from the refrigerating chamber to the blowing engines.

The following table shows the record of operations for the month of December, 1904, in which it is interesting to note the decrease in moisture as compared with November. In November the average moisture was 1.99 grains, while in December it was 1.45 grains, the maximum variation, however, being from 0.55 to 3.91 grains. There is also a slight reduction in the grains of moisture in the dry air.

	Grains of moisture. In atmosphere.		Grains of moisture. In dry blast.		Temperature Degrees F. At-mosphere.		Temperature Degrees F. Dry blast.		Gas analysis.	
Year 1904.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	CO.	CO_2
Average	1.41	1.47	0.94	0.92	34	33	17	18	23.5	13.8
Maximum	3.91	3.50	1.41	1.25	58	53	24	27	...	...
Minimum	0.68	0.55	0.43	0.44	15	13	7	9	...	...

The air conduit pipe from the refrigerating chamber to the blowing engine room was constructed to connect with four blowing engines, and as only three engines were used on Furnace No. 1 it was decided to connect the fourth engine with the dry air conduit and apply it to Furnace No. 3, thus making on No. 3 two engines with natural air and one engine with dry air. The comparison of the work of Furnaces Nos. 1 and 3 and the effect of one-third of the engine revolutions supplying dry air to No. 3 Furnace is shown as follows:

	Average daily product.—Tons (2,240 lbs.)	Average coke consumption. Pounds.	Blowing engines. Revolutions per minute.	Aver. temperature hot blast. Degrees F.
No. 1 furnace (dry blast)	.455	1,823	96	877
No. 3 furnace:				
December 1-22 (normal blast)	.400	2,309	111	785
December 23-31 (1-3 dry blast)	.461	2,140		

Although one-third of the engine revolutions supplied dry air, yet the weight of dry air was slightly in excess of one-third the total quantity, by reason of the air being denser.

The result shown by the use of such a small quantity of dry air is remarkable, and is greater than was experienced when first applying the dry air to Furnace No. 1 in August. The application of one-third of the engine revolutions with dry air increased the weight of air delivered to the furnace, and at the same time the average temperature of hot blast increased 20 degrees. The furnace at once began to drive more rapidly and the burden was also increased. There was no deterioration in the grade of metal produced; in fact, it was slightly better, as the silicon was higher and sulphur lower than in the preceding part of the month.

In the following table is set forth the record for January, 1905, wherein is found a further reduction in the humidity of the atmosphere.

	Grains of moisture. In atmosphere.		Grains of moisture. In dry blast.		Temperature Degrees F. At-mosphere.		Temperature Degrees F. Dry blast.		Gas analysis.	
Year 1905.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	CO.	CO_2
Average	1.26	1.23	0.67	0.60	29	28	11	10	23.3	13.5
Maximum	3.31	2.89	1.34	1.14	53	51	22	20	...	...
Minimum	0.47	0.42	0.28	0.27	10	9	1	2	...	...

On January 10 the dry blast was changed from Furnace No. 1 to Furnace No. 3. Both furnaces were making the same grade of iron for use in the basic open hearth process. In the exhibit below no account is taken of the period from the 11th to the 14th, inclusive, as this period was occupied in adjusting the dry blast and burden on both furnaces. The record of the burden on each furnace shows as follows:

	Weight of coke in charge. Pounds.	Weight of ore in charge. Pounds.
No. 1 furnace:		
January 1-10 (dry blast)	10,200	24,000
January 15-31 (normal blast)	10,200	20,200
No. 3 furnace:		
January 1-10 (normal blast) (extra coke in charge)	10,200	20,200
January 15-31 (dry blast)	10,200	23,600

During the period from January 1 to 10, when No. 3 Furnace was on normal blast, there was charged with the regular burden a small quantity of extra coke. This was taken off when the furnace was changed to dry blast, which would make the burden with dry blast for No. 3 Furnace correspond with No. 1 Furnace with dry blast. The result on each furnace, before and after the change in blast had been made, is as follows:

	Average daily product.—Tons (2,240 lbs.)	Average coke consumption. Pounds.	Blowing engines. Revolutions per minute.	Aver. temperature hot blast. Degrees F.
No. 1 furnace:				
January 1-10 (dry blast)	.428	2,078	96	869
January 15-31 (normal blast)	.414	2,340	111	771
No. 3 furnace:				
January 1-10 (normal blast)	.410	2,351	111	716
January 15-31 (dry blast)	.432	1,811	96	802

The ore mixture on Furnace No. 3 gave a yield in iron 1 per cent. greater than the mixture on Furnace No. 1. The purpose in changing the dry blast from Furnace No. 1 to No. 3 was to determine the economy on another furnace at a time which represented in that locality nearly the minimum of humidity in the atmosphere, the extreme variation being from 0.38 to 3.31 grains, with a monthly average of 1.25 grains of moisture per cubic foot

* Presented at the Washington meeting of the American Institute of Mining Engineers, May 3, 1905, and simultaneously sent to the Iron and Steel Institute, for presentation at the meeting of that Society in London, May 11, 1905.

of air. The response to the application of dry air blast was prompt and efficient in result, and clearly demonstrated that even at periods when the humidity of the atmosphere was relatively low substantial economy in fuel could be obtained. As already pointed out, an important advantage obtains by keeping the moisture in the air more uniform. Although the atmosphere is much more humid in the summer than in the winter months, yet in the latter the percentage of variation is much greater. A comparison of the average humidity of the several months of the year is misleading as to the effect of such humidity on the operations of a furnace, since such average results do not take into account the wide fluctuations from day to day, and even in the same day. During the past winter in the Pittsburgh district, and generally throughout the Northern States, there has prevailed a protracted cold season, and since the beginning of our observations there has been no winter season showing a lower average of humidity than the one just ended; therefore any demonstration under these conditions of the efficiency of dry air blast, in comparison with a furnace using normal blast, is made at a time when the furnace operated with normal blast is at its highest efficiency.

It has been thought by some that the use of dry air blast might be dispensed with in the winter months, when the content of moisture in the atmosphere is very low. There could scarcely be a month more favorable to the study of the effect of dry air than that presented in the month of February, 1905, where the average of moisture is 1.19 grains for the daytime, and 1.17 grains for the night, with a maximum variation of 0.30 to 2.57 grains of moisture per cubic foot of air. In the following table is shown the record for that month, and it will be noted that during several days the average moisture content of the atmosphere is lower than the average for the month in the dry blast.

	Grains of moisture. In atmosphere.		Grains of moisture. In dry blast.		Temperature Degrees F. At- mosphere.		Temperature Degrees F. Dry blast.		Gas analysis.	
Year 1905.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	CO.	CO_2
Average....	1.19	1.17	0.65	0.54	28	27	8	8	23.9	13.4
Maximum..	2.57	2.27	1.11	0.97	43	41	16	17	...	...
Minimum...	0.39	0.30	0.31	0.18	8	7	0	1	...	...

The record of operations is as follows:

	Average daily product.—Tons (2,240 lbs.)	Average coke consumption. Pounds.	Blowing engines. Revolutions per minute.	Aver. temperature hot blast. Degrees F.
No. 1 furnace (normal blast)	424	2,248	111	800
No. 3 furnace (dry blast)	412	1.815	96	784

As already pointed out, the benefits derivable from the use of dry air can be directed in the main to increase of production, or to decrease in coke consumption, or to both purposes. In the month of February, by reason of the dry atmosphere and the large volume of air on Furnace No. 1, the operations at Furnace No. 3 were directed principally toward economy in coke. The output on Furnace No. 3 is less than on No. 1, as the former was stopped several times during the month on account of breakdowns of slag machine and breakouts of iron at the hearth. Notwithstanding the low content of moisture in the normal blast and representing conditions rarely obtained in that district, the furnace supplied with dry blast made, considering the stops, practically as much iron—with a consumption of coke 433 pounds less per ton of iron—as the furnace supplied with normal blast. As the summer season approaches the product of the furnace using normal blast will steadily decrease and the fuel increase, while the work of the furnace supplied with dry air will continue practically uniform. It is doubtful if a better illustration can be had than that offered by the month of February in demonstrating the value of maintaining the blast practically uniform as to dryness.

As will be seen by the table for March, the advent of the spring months makes a material increase in the moisture. The operations in March were seriously interrupted by reason of high water in the Allegheny River, which flooded the works, and caused a shutdown of several days. On account of this shutdown extra charges of fuel were added to both furnaces. On starting the plant, Furnace No. 3, supplied with dry air, responded more quickly and reached the normal grade of iron in one day, while it required three days to obtain like results on Furnace No. 1. The record for the month is set forth in the following table:

	Grains of moisture. In atmosphere.		Grains of moisture. In dry blast.		Temperature Degrees F. At- mosphere.		Temperature Degrees F. Dry blast.		Gas analysis.	
Year 1905.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	CO.	CO_2
Average....	2.25	2.25	1.01	0.89	48	45	14	14	23.7	13.7
Maximum..	4.80	4.08	1.65	1.54	68	68	24	24	...	...
Minimum...	0.78	0.78	0.55	0.42	29	27	4	5	...	...

	Average daily product.—Tons (2,240 lbs.)	Average coke consumption. Pounds.	Blowing engines. Revolutions per minute.	Aver. temperature hot blast. Degrees F.
No. 1 furnace (normal blast)	411	2,274	111	850
No. 3 furnace (dry blast)	405	1,837	96	784

The product on No. 3 Furnace is a little less than on Furnace No. 1, but No. 3 was banked nearly one day longer than No. 1, which would more than make up the difference.

In the discussion of my paper presented to the Institute in October, 1904, I note a comparison of the Isabella with the Edgar Thomson furnaces, without due regard being given to the different conditions existing at these plants. During the period covered in this communication the Edgar Thomson furnaces worked with a mixture of ores yielding 55.5 per cent. of iron, while the Isabella mixture yielded but 51.5 per cent. of iron, and in addition the stoves at the Edgar Thomson gave a temperature from 200 to 300 degrees higher than at the Isabella. The results achieved by the use of dry blast have been from furnaces that might properly be designated as old furnaces; they have been banked several times, which invariably has a deteriorating effect, and the coke used was an inferior grade from the Connellsville region, and used altogether on furnaces making basic iron.

The data presented in this communication are the furnace records entire for the points covered, and in considering them it is important to bear in mind that comparisons made with the dry blast are under atmospheric conditions when furnaces operated with normal blast are doing their best work.

The Henry W. Oliver Estate.—George T. Oliver, Henry R. Rea and the Union Trust Company of Pittsburgh, executors of the estate of Henry W. Oliver, filed their first and partial account in the courts at Pittsburgh last week. They charge themselves with $18,433,573, claim various credits, and have a balance on hand of $14,253,810.61. The account does not include the real estate. The balance on hand consists largely of stocks. The principal items are 21,794 shares of Oliver Iron & Steel Company, $5,448,500; 96,290 shares Pittsburgh Coal Company, common, $1,209,875; 12,200 shares Pittsburgh Coal Company, preferred, $610,000; 19,797 shares Calumet & Arizona Mining Company, $1,187,820; 28,165 shares Calumet & Pittsburgh Mining Company, $281,650; 17,250 shares Lake Superior & Pittsburgh Mining Company, $127,500; 11,625 shares Pittsburgh & Duluth Mining Company, $69,750; 2750 shares New York Shipbuilding Company, $137,500; 11,000 shares Harvey Iron Company, $275,000; 800 shares Neeb-Hirsch Publishing Company, common, $64,000; 583 shares Standard Car Company, $58,300; 100 shares Safe Deposit & Trust Company, $40,000; 1819 shares Great Lakes Coal Company, $61,875; 7000 shares preferred and 6533 1-3 shares common, Detroit Iron & Steel Company, $42,000; 418 shares Standard Chain Company, preferred, $29,225; 155 shares Standard Chain Company, common, $10,944; 29 bonds of Standard Chain Company, $29,000; leases, Chemung Iron Ore, $4,000,000; city of Pittsburgh, $81,994.57; bills receivable, $205,000; Keith mortgage, balance, $100,000. Since the filing of the inventory and an appraisement the amount received in cash, being the income of the personality, was $471,256.94. This was received from dividends on stocks, interest on notes, mortgages, daily balances, &c. In addition to this, $43,145.55 was received from items not included in the inventory and amounts received in excess of appraised values of securities sold.

The Philadelphia Foundrymen's Association.

The one hundred and forty-seventh regular meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club in that city May 3. The meeting was called to order by the president, Thomas Devlin, at the usual hour. The report of the treasurer, showing a balance of nearly $2100 on hand, with all indebtedness paid, was received, and other business of a routine character transacted.

The paper for reading and discussion was entitled "Some Core Binder Troubles," by J. S. Robeson, president of the American Glutrose Company, Camden, N. J., who by the aid of lantern slides and specimens of various core sand mixtures, as well as finished cores, profusely illustrated his interesting paper. In the discussion which followed there was quite a variance in opinion as to what are the best core sand mixtures for various purposes. What would be perfectly satisfactory to one had produced unfavorable results with others. It was asked if cores of 4-inch diameter would have the same strength in proportion to their size as did the ⅞-inch diameter core exhibited, and while no experiments had been made in that direction it was thought that such would be the case. By some it was considered that the relative size of the grains of sand used in the core sand mixture should vary in relation to the size of the core. Again it was brought out that sand of comparatively uniform grain and texture, used on a general class of work, produced good results, while old sand and in cases new sand alone are said to have been used satisfactorily with various binders. All in all no definite conclusions could have been deduced from the discussion, although plans for future experiments along the same line as conducted by Mr. Robeson were suggested.

In concluding the discussion, Mr. Robeson said that gluetrin under temperature variations became more fluid as the temperature increased, but did not freeze, and, except for slight thickening, was in no way affected by freezing temperature. In practical use gluetrin cores, it was said, give off but little smoke or gas, neither of which was offensive or irritating to those engaged in the foundry work.

A vote of thanks was extended Mr. Robeson for his interesting paper, after which the meeting adjourned.

The protected cruiser St. Louis was launched May 6 at the Neafie & Levy Shipyards, Philadelphia, Pa.

A Nine-Inch Motor Driven Star Lathe.

A neat application of motor drive to a small engine lathe in which speed variation is obtained by a combination of electrical and mechanical means is illustrated herewith. The Seneca Falls Mfg. Company, Seneca Falls, N. Y., built the machine, which is known as a 9-inch Star engine lathe, and designed the new head stock making use of a motor manufactured by the Northern Electrical Mfg. Company, Madison, Wis. The general appearance of the combination is shown in the Fig. 1, and Fig. 2 gives several views and sections of the head stock.

The motor runs at six speeds, from 1000 to 2000 revolutions per minute, and with the two sets of back gears, the first giving a ratio of 7 to 1 and the second 14 to 1, makes possible 18 different spindle speeds, varying from 14 to 420 revolutions per minute. Referring to Fig. 2, the construction and manipulation of the change gear device may be understood. The motor carries a rawhide pinion, *a*, meshing with an intermediate pinion, *b*, which in turn meshes with a gear, *c*, on the lathe spindle. The latter is in one piece with a quill carrying the pinion *d*, and is itself the female member of a friction clutch. The quill of the gears *c* and *d* is free on the spindle, and the male member of the friction clutch is keyed slidably to it. The pinion *d* meshes with the large gear *f* on the back gear shaft, the latter being on a quill in one piece with the pinion *g*, to which the pinion *h* is also keyed. The pinion *g* meshes with the gear *i*, and the pinion *h* with the gear *j*. The latter is keyed on a quill, which runs freely on the spindle, and has teeth at *k* adapted to engage teeth on the other member *l* of a positive jaw clutch. The part *l* is in one piece with the male member of the friction clutch, which as before stated is fixed against rotation on the spindle. The gear *i* runs freely on the quill of the gear *j*, and has clutch teeth, *m*, adapted to engage *l* when it has passed completely over *k* and is no longer in engagement with the latter. This completes the part of the mechanism involved in securing the various spindle speeds.

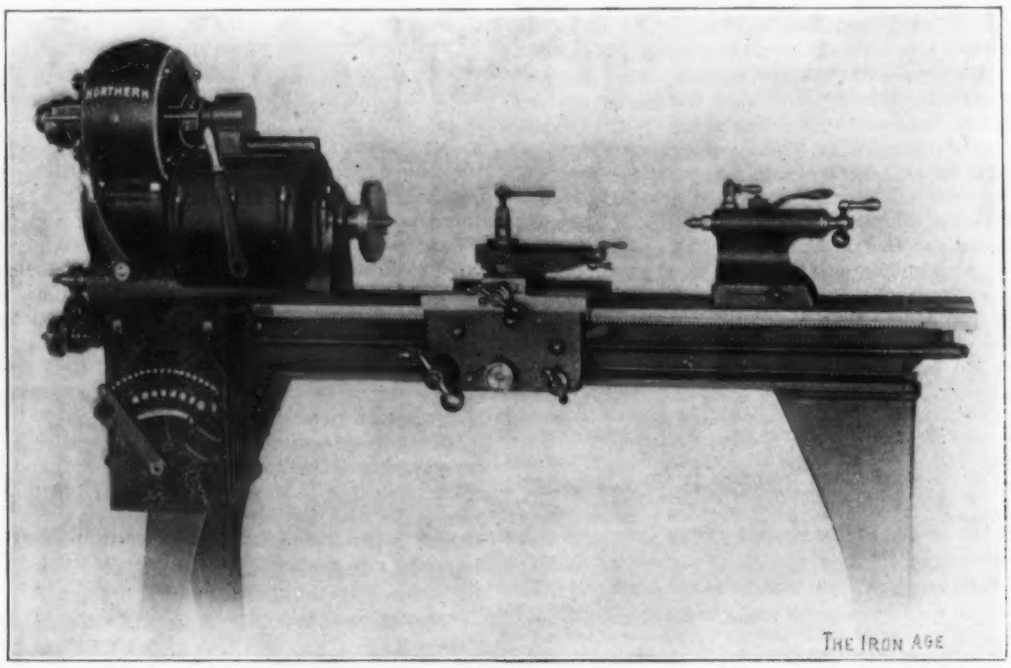


Fig. 1.—A 9-Inch Star Engine Lathe, with Special Head Stock, Made by the Seneca Falls Mfg. Company, Driven by a Northern Electric Motor.

It will be seen that all of the gears run continuously, but that only one set can be operative at a time to revolve the spindle. The position of the part *l* is the factor determining which set of gears is in action. This part is manipulated by the lever *n*, which is connected through a rock shaft with the yoke *o*. The lever *n* is the right hand handle shown in the half-tone, Fig. 1. In its extreme left hand position the friction clutch is engaged and the spindle revolves at the same speed as the gear *c*.

With the six speeds available in the motor the lathe may be driven at from 56 to 420 revolutions per minute. Moving the lever to the right releases the friction clutch and causes the positive clutch to engage *k*, bringing the intermediate range of speeds into operation. There are also six of these, giving the lathe speeds of from 28 to 56 revolutions per minute. Moving *n* still further to the right allows the teeth *k* to pass beyond engagement with the teeth *l* in the recess behind the latter and causes *l* to engage the teeth *m*, setting the slowest range of speeds into action. This position corresponds to the six lathe speeds from 14 to 28 revolutions per minute.

The feed mechanism is driven from the pinion *p* on the outer end of the spindle. This meshes with an intermediate pinion, *q*, which is mounted on a pull shaft, allowing it to be drawn out of engagement when it is desirable to stop the feed shaft. The pinion *q* meshes with *r*, which is in one piece with the bevel pinion *s*, and both run freely on the feed stud except when clutched to the stud, as explained later. The bevel pinion *v* also runs loosely on the stud normally, being driven in the opposite direction by *s* through the bevel gear *u*. The clutch *t* is slidably keyed to the stud and may be engaged with *s* or *v* by sliding it to one side or the other. The handle manipulating this clutch and giving the direct or reverse motion to the feeding mechanism is *w*, the one at the left just under the motor in Fig. 1.

Beyond this part of the mechanism the feeding is accomplished in the usual way, and the lathe is in all other respects from those which have been described in detail the regular stock machine built by the company. The motor is of a variable speed type that has been made by the Northern Company for some time, and was referred to at length in connection with an illustration of a Blaisdell lathe with motor drive in *The Iron Age* for February 9, 1905.

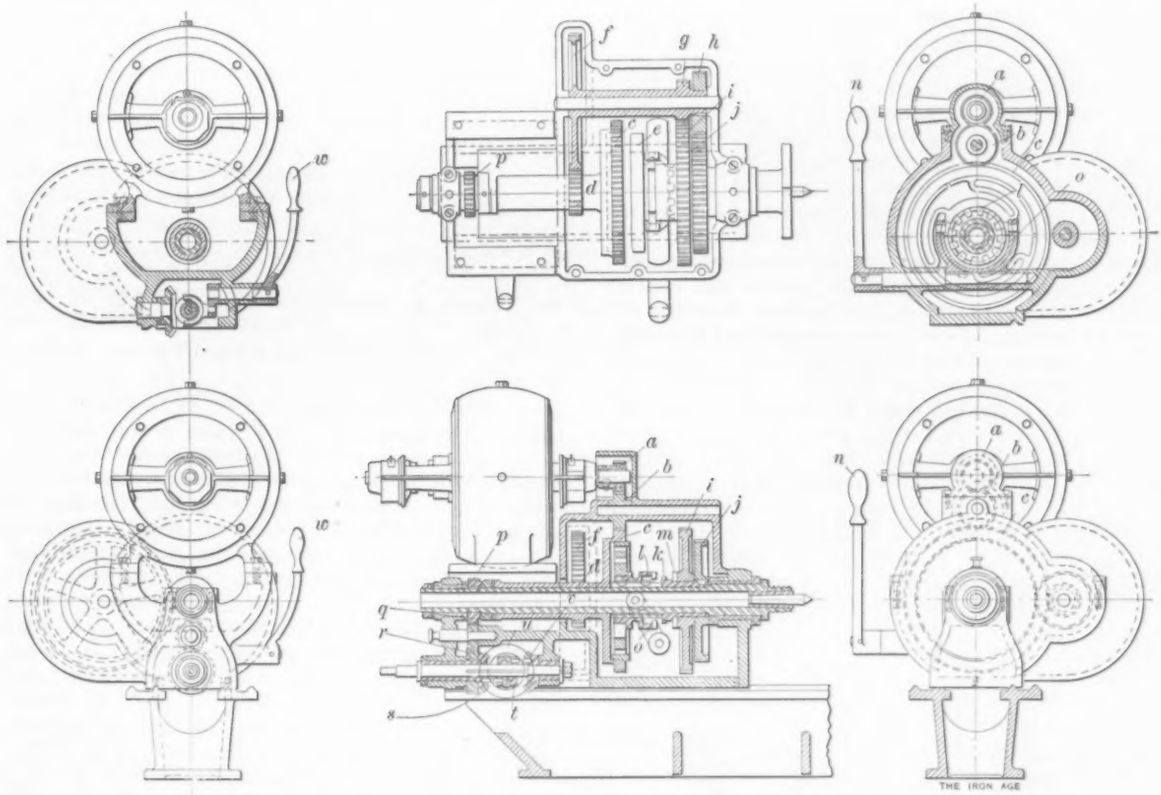


Fig. 2.—Details of the Head Stock of the Motor Driven Star Engine Lathe.

The annual meeting of the stockholders of the General Electric Company was held in Schenectady, N. Y., May 9. The following directors were elected: Gordon Abbott, Oliver Ames, C. A. Coffin, T. Jefferson Coolidge, Jr., W. M. Crane, Fred P. Fish, George P. Erdner, Eugene Griffin, T. K. Henderson, Henry L. Higginson, J. Pierpont Morgan, J. P. Ord, Robert Treat Paine, 2d, E. W. Rice, Jr., and Charles Steele. The directors will meet shortly and elect officers.

Incandescent Gas Lighting.

Interesting figures comparing incandescent gas with electricity for lighting were contained in a paper recently read before an association of civil engineering students by Mr. Newbigging, chief engineer of the Manchester (England) Gas Works. At Manchester prices, he states, that electricity is eight times more expensive than gas. Per cubic foot of gas consumed, an incandescent gas burner develops from 15 to 40 candle-power, according to the system employed. With gas at 56 cents per 1000 feet and electricity at 7.72 cents per unit (average Manchester prices), and taking the lowest power for the gas burner, 15 candles per cubic foot, the cost per 1000 candles would be 3.72 cents for gas and 30.10 cents for electricity, one unit of electricity being capable of developing 256 candle-power.

An abstract of this paper was published in a recent issue of the *Gas World*, London, England, which also contained interesting information by authorities in two other gas companies. One, Sir George Livesy of the South Metropolitan Gas Company, London, mentioned that by test it was found in one factory that with incandescent burners the consumption of gas was one-third less than it had been with the best flat flame burners, while the light was greatly superior.

At a meeting of the Gas Light & Coke Company at Manchester, England, Col. Sir William Thomas Makin demonstrated that a gas burner can be as easily manipulated as an electric light. By pressing a button on his desk he lighted and extinguished two incandescent gas burners high up on the wall of the room. The device is a Swiss invention now being manufactured by a Birmingham firm, and embodies a "pilot light," which burns continuously, being supplied through a small by-pass. A little piston, situated where the key is ordinarily placed on a gas burner, when moved forward allows the gas to flow to the burner where it is lighted by the pilot light, and when moved backward cuts off the supply except to the pilot light. The piston is operated pneumatically, and is connected by a small copper tube about the size of a telegraph wire, with a button plunger conveniently placed so that a person entering the room may press it, thus compressing the air and causing the piston on the burner to move and open the gas supply to the burner.

The Mining Engineers.

Under the presidency of James Gayley the thirty-fifth annual meeting of the American Institute of Mining Engineers, held at Washington last week, was distinguished for the sustained interest in the technical sessions, the valuable papers in very widely different fields and the activity and high character of the discussions.

The first session, on Tuesday evening, May 2, was occupied by the reading of biographical notices by Dr. R. W. Raymond, one being from the pen of Dr. Henry M. Howe, on the life and work of Sir Lowthian Bell; the other, by Dr. Raymond himself, on the late Dr. Thomas M. Drown.

Wednesday morning brought the presentation by James Gayley, first vice-president of the United States Steel Corporation, of additional data on the results obtained at the Isabella furnaces with the dry air blast. We print the principal figures in this paper elsewhere.

The Gayley Dry Air Blast.

The discussion was opened by a suggestion from Dr. R. W. Raymond that the passage of the blast through the refrigerating chamber ought, at least theoretically, to reduce the moisture in the dry blast to a practically constant quantity, corresponding to the fall in the temperature. As a matter of fact, as shown by the tables, the moisture in the dry air blast seems to rise and fall with the quantity of moisture in the natural air. There should be a fixed residuum of moisture in the dry air, irrespective of the moisture in the air at different periods. Mr. Gayley explained that in winter the brine temperature is lower, the compressor being run at a uniform speed. The fluctuations in moisture contents are due also to the fact that as the apparatus is now designed one-third of the coils are thawed off every day. During that thawing period the moisture in the dry air increases. In a new plant the chambers should be divided into sections, so that the thawing process could be carried on without affecting the moisture of the dry air in use during that thawing operation. Mr. Gayley expressed the conviction that with the plant designed with such a modification he could maintain at practically the same level the moisture contents from day to day and almost during the whole year. In response to a question by Professor Kemp whether the diminution of the moisture contents has any appreciable effect upon the character of the slag, or on the silicon contents of the pig iron, Mr. Gayley stated that the silicon is the thermometer of the hearth. When the silicon creeps up with the application of the dry air blast the furnace is loaded down with more burden and the fuel consumption is decreased. S. W. Croxton of Cleveland asked whether the silicon contents of the pig averaged the same. Mr. Gayley, in response, stated that before the application of the dry air blast producing basic open hearth pig the silicon ranged between 0.6 and 0.75 per cent. The first records with dry air blast ran about the same, and a greater decrease in coke consumption accompanied it. Later on, however, the silicon with dry air blast has been about 0.15 per cent. higher, so that the fuel economy ought to show better, the silicon being too high.

Joseph E. Johnson, Jr., of the Longdale Iron Company, Longdale, Va., contributed to the discussion an elaborate paper, an outline of its points being presented in letters printed in *The Iron Age* of February 16 and 23. Mr. Johnson's argument was followed with the closest attention and received cordial indorsement. One interesting point, chemically, was noted by Dr. C. B. Dudley of Altoona, Pa., that oxygen does not combine with carbon in the absence of water vapor, as possibly having some bearing. In response to a question from W. F. Mattes of Scranton, Pa., on the question of the commercial results obtained, Mr. Gayley pointed out that the saving in power in the blowing room compensated for the cost of operating the refrigerating plant. There are further the economy of coke, the decrease in waste, when using a heavy proportion of Mesaba ore, and the saving in limestone. Mr. Gayley noted that local conditions must control the amount by which cost can be reduced. He has been furnishing the facts from which those interested may figure on the basis of their own local conditions. He stated, however, that it was his belief that the plant for the dry blast system will repay in one year's operations.

Mr. Mattes made the point that there is a great advantage to the operator in the control which the dry air blast gives him, so that the furnace manager does not need to hold something in reserve, but may work his furnace up to the limit. David Baker of Philadelphia pointed out that evidence in favor of the dry blast is furnished by the practice of taking the blast from the outside of the engine room. At Sparrows Point he built a wooden flue to connect the outside air with the inlet valves of the blowing engines. Where formerly the leathers of the inlet valves burned out in one month, they lasted three months when the connection with the outside air had been made, thus increasing the capacity of the blowing engines. Mr. Baker dwelt upon the desire of the manager to have reserve heat. With the dry air blast he can go closer and crowd on burden. John Birkinbine of Philadelphia and F. E. Bachman of Port Henry, N. Y., referred incidentally to the influence of fine ores and fine coke in causing furnace explosions. Mr. Gayley informed the meeting that he arranged first for taking the blast from the outside of the engine room, in 1896, at Duquesne. The results were disappointing.

James P. Roe of the Glasgow Iron Company, Pottstown, Pa., then read some abstracts of his paper on

The Manufacture and Characteristics of Wrought Iron.

Mr. Roe is the inventor of the puddling process which bears his name, and which has been in operation at Pottstown for a considerable period. The apparatus has been fully described in *The Iron Age*. Mr. Roe, in the present paper, sketches the history of puddling and of the mechanical appliances which have been tried to overcome the use of hand labor. Taking up the reactions of the puddling process he continues:

Reactions of the Puddling Process.

The puddling process permits the use of irons of greatly varying composition. My experience covers irons containing as much as 3 per cent. of silicon and of phosphorus, 2.5 per cent. of manganese and 0.35 per cent. of sulphur, though, of course, not all in the same pig iron. In all these cases iron was produced that would weld freely and showed no cold or red short tendency. It is not my intention to convey the impression that such extreme irons are desirable. On the contrary, they are costly in time, labor and iron loss. For rapid work, good yield and fitness for ordinary uses, a desirable composition would be about 1 per cent. of silicon, a somewhat smaller percentage of phosphorus, 0.1 per cent. of sulphur and 0.5 per cent. of manganese. For special grades it is necessary to select the pig in each particular case.

The various iron oxides, charged as fettling, flux and oxidizing agents, should be characterized, in the order named, by infusibility, fusibility and the ability to be readily reduced, for the part they respectively play in the operation. The flux, as the material directly forming the cinder, must be present in sufficient quantity to receive the oxidized metalloids, and low enough in silicon to retain them as the temperature of the bath increases. This cinder is the vehicle for oxygen, whether supplied by roll scale, ore or the oxidizing gases of the furnace; it protects the puddled mass from undue oxidation by the gases; and, finally, it forms the welding cinder. Its composition is changed during the process by additions, by reactions upon the fettling and the bottom, and by the condition of the fire and position of the damper.

The control of the volume of cinder, in the various stages of puddling up to the finished product, may be mentioned here. Throughout all these stages it is primarily controlled by its composition as affecting its fusibility. In the ball when drawn it is controlled largely by temperature at the time of going on high boil and at the time of drawing, this temperature, at both periods, being chiefly governed by the damper. In the shingled ball it is controlled by the amount of work or pressure; the cinder being generally smaller in amount when a hammer, than when a squeezer, is used. In the puddle bar and in the finished product it is dependent upon the

reduction in area and the rapidity of this reduction. These conditions put the process thoroughly under the control of the operator. High cinder contents are desirable for free welding, for such purposes as pipe making, &c., and low cinder contents when the product is to be subject to severe physical strain.

The object of agitation, which is ordinarily accomplished by the rabble, is to produce as uniform conditions as possible throughout the bath; to bring into intimate contact the cinder and iron, and to prevent as far as possible the settling of the iron, in a partly refined condition, on the relatively cold bottom and its becoming, as a consequence, too cold on the under side. This occurs in a measure during the "drop," particularly in large furnaces, and necessitates "turning."

Small heats, such as are still worked at Low Moor, England, are best adapted for uniformity of product, since the workman has not the physical strength and endurance to agitate the larger baths efficiently, though he obtains material assistance from a good "high boil." Another disadvantage in large furnaces is the necessity of starting to draw "young," since otherwise the later balls are subject to severe loss. The irregularities thus produced are, however, largely overcome by the subsequent treatment of piling and reheating. Piling operates as a fairly efficient mixing by the natural law of chance: and reheating helps, by maintaining the iron at a temperature and for a period which permit both the oxidation of the carbon of the "young" iron and the reduction of some of the cinder present. Hence the small pieces of which an iron pile is formed are desirable under existing methods of producing puddled iron. But piling has also its disadvantages, in the production of laminations, due to carelessness, or lack of means or skill, and in the high cost of handling loose piles.

The Structure of Puddled Iron.

By reason of decreased fusibility through the elimination of carbon puddled iron crystallizes ("comes to nature") at a lower temperature than steel. Each grain or crystal is surrounded by an envelope of cinder, which, when the clusters are dense, fills the intervening spaces. The greater part of this cinder is then hammered or squeezed out, and the succeeding operation of rolling elongates the crystals into what are commonly known as fibers, each fiber existing in a matrix of cinder. This fibrous formation in a matrix of ferrous silicate is the controlling characteristic of wrought iron, and the source alike of its virtues and its faults. The fibrous structure can be distinctly seen under the microscope at various powers, and often with the naked eye. It is perhaps more correctly described by Professor Howe, who says: "I understand that this 'sort of fiber' is more apparent than real, the grains themselves being equi-axed, yet separated into quasi-fibers by layers of slag. . . ."* Admitting the correctness of this remark, each series of crystals forms an integral structure, which has to be ruptured separately, producing, in everyday practice, results analogous to those we would look for in a true fiber.

Many instances of the arrest of fracture by the fiber occur in the experience of most engineers with shafts, bolts, chain hooks, &c. An illustration recently came under my observation. About two years ago a shear cam shaft, 9 inches in diameter by 48 inches between journals, was bent about 0.5 inch at one side of one of the two cams, producing a crack about 2 inches deep and open almost ⅛ inch. The lateral movement of the large spur wheel, due to the bend, was carefully noted and measured at frequent intervals to learn whether the fracture was extending. As it did not extend and no convenient opportunity offered for straightening the shaft ran till July of last year, when it was taken out, straightened and replaced. It is doing good work and running true to-day. Had it been steel it would have been necessary to take it out at once and, after straightening, anneal it; even then a greater risk would have been run than with wrought iron.

Drive pipes for wells furnish another illustration. Wrought iron withstands the shock of driving at the threads, whereas steel breaks off at the root of the threads.

A blast furnace plant of two stacks had an experience bearing upon this question. One stack was erected about 30 years ago, with a shell of wrought iron plates; the other about four years ago, with a shell of basic open hearth steel plates. Both were evidently subjected to the same character of strains, and in approximately the same position. The wrought iron shell bulged out under strain but did not crack, while the steel shell suffered a vertical rupture extending about 20 feet and not following to any marked degree the lines of the riveted joints.

Physical tests of steel made in the laboratory on an 8 or 10 inch section give results which superficially appear to be superior to those of wrought iron, particularly in the feature of elongation. But when studied with greater care the elongation is seen to be largely concentrated and not so uniformly distributed throughout its length as is that of iron.

This tendency to concentrated elongation in steel and to more widely distributed elongation in wrought iron is shown in their respective tests, in full sized sections, for eye bars in bridges, the specified elongation being the same for iron and steel in a length of 10 feet. The following are results of such tests:

	Elastic limit. Pounds per square inch.	Ultimate strength. Pounds per square inch.	Elongation, per cent. In 12 inches.	In 18 feet.	Reduction of area. Per cent.
Iron	31,550	48,810	23	15.22	28.30
Steel	33,150	59,260	39	14.40	51.50

There is greater general confidence in welded articles made of iron than of steel. This is well founded: the cinder present in iron and its low carbon contents naturally facilitate welding. This receives further confirmation from the fact that as the carbon is increased in steel the uncertainty of a good weld becomes greater.

Resistance to Oxidation.

That wrought iron resists oxidation better than steel is becoming the general opinion of those who have studied the question under actual working conditions. The difference is naturally more apparent in thin objects, such as corrugated roof sheeting, tin plate for roofing and the like; but its influence is the same, regardless of mass. The difference in the life of light sections is about as 5 to 1 in favor of puddled iron.

The explanation of this resistance to oxidation is twofold.

1. The cinder, a ferrous silicate, enveloping each fiber, is much attenuated by rolling, and in that condition is elastic. A piece of iron fresh from the rolls is covered with relatively thick scale, which will readily crack off to a large extent, exposing a surface of iron fibers with its intervening cinder. These fibers oxidize somewhat rapidly, leaving a finely corrugated surface of cinder, which resists further atmospheric action, as may be seen in heaps of *scoriæ* from old hearths, believed to date from before the Christian era. Being elastic, it resists for considerable though varying periods; but eventually it cracks off under vibration, expansion and contraction or mechanical wear. The cycle is then repeated, and so on.

2. Puddled iron is a mechanical combination of two substances, iron and cinder, which offer differing resistances to such pressure as that of rolls or hammers. The result is a rough surface, which forms a more lasting bond with any protecting agent, such as tin or paint, than the smooth surface of steel, which does not aid in any way the adhesive qualities of the protecting agent.

In connection with the question of oxidation I may instance the experience of a large tube works, carrying a considerable stock of iron tubes and accustomed to take from, and add to, the top of the stock pile without regard to the tubes in its lower part, knowing that these, when ultimately reached, would be found to be corroded uniformly over their whole surface but could be rerolled to a lighter gauge, producing perfect tubes. After beginning to make steel tubes they followed the same practice; but these tubes were found after rerolling to be pitted through and therefore valueless.

I am indebted to Dr. Raymond, secretary of the Insti-

* *The Metallurgy of Steel*, by Henry M. Howe, p. 193.

tute, for the suggestion contained in the following communication:

In preparing your paper for the press I notice that you have omitted to mention, in connection with the question of the more rapid oxidation of soft steel, a chemical reason—namely, the presence of manganese in that metal. Many years ago, as consulting engineer of the firm of Cooper, Hewitt & Co., I approved the substitution of low carbon steel for wrought iron for certain articles of manufacture. The immediate result was complaint from both consumers and selling agents that these articles rusted so soon as to look old even upon delivery. A careful investigation, conducted for the firm by the late Dr. T. M. Drown, located the source of this trouble in the manganese of the low steel, or "ingot iron." In that particular case the rapid surface corrosion probably did not affect the real usefulness of the articles. But it may easily be inferred that, when a coating of tin, zinc or paint is applied to a sheet of metal, a very slight extra liability to oxidation in that metal may set up a series of chemical and galvanic reactions of destructive character.

I have had recent occasion to realize with surprise and consternation the imperative necessity of frequent repairs to roofs, pipes, &c., of tinned or galvanized iron. My trusted mechanic declares that all his customers are similarly affected, and protests that he can no longer obtain anywhere materials of this class as durable as they used to be. He thinks that something is the matter with the processes of coating with tin or zinc; but I shrewdly suspect that the trouble lies in the manganese of the metal coated and in the series of reactions which its easy oxidation initiates.

It seems to me that the "pitting" of steel, to which you refer, is directly due to manganese.

Defects of Wrought Iron.

Under this head we have to consider transverse weakness, lower ultimate strength, laminations and high labor cost in production.

1. Transverse weakness is inherent, though less marked as the cinder contents are reduced.

2. Lower ultimate strength and elastic limit, demanding (for the same factor of safety and if the possible effects of the "pitting" of steel be ignored) a greater section for a given strain, is also an inherent weakness so long as the product is made from built up piles, requiring low carbon as an essential condition for good welding.

3. Laminations, due to imperfect welding, are commonly the result of inefficient machinery or lack of skill. This defect also is inherently associated with the use of built up piles, especially when these are made, wholly or in part, from scrap of miscellaneous character. I recall an instance in which a lot of 1⅛-inch "rounds" were ordered to be made for special bolts, from muck bars only. While cutting them to length on the anvil we noticed that after superficial nicking some pieces fell off, even without bending. Upon investigation, the so-called "iron" was found to include pieces of hard steel rail, fairly well defined in form and surrounded by soft wrought iron, presumedly "muck bar," which peeled off with the freedom of a banana skin, the exterior and the core not being welded together.

4. The high labor cost of production is probably the principal cause which has checked, during recent years, the legitimate increase in the use of wrought iron. It is constantly receiving greater emphasis, as the younger generation of workmen, with greater educational advantages, turns away from arduous manual toil and particularly from the opprobrium attached to the term "puddler" as indicating a relatively servile and ignorant class. This stigma has existed from time immemorial in India, where the iron worker is ranked in the lowest caste. The severity of the work, together with the inferior social status of the worker, has depopulated puddling mills in this country and England and caused, in certain districts, the abandonment of puddling.

With the exception of relative transverse weakness, all the above shortcomings of wrought iron are due to the method of manufacture rather than to inherent qualities of product. Iron puddled in large masses by mechanical means and rolled direct, as soft steel is, would give us fibrous structure, resistance to oxidation, high tensile strength, low cost and the absence of laminations. Such a material would cover the field now jointly held by puddled iron and soft steel, even to the possible use of the latter for rails.

Conditions Essential to Successful Puddling.

The conditions necessary to produce such iron are: 1. A large unit of manufacture; 2, adequate mechanical means; 3, cinder of proper composition; 4, a flame of the right composition and temperature; 5, a relatively permanent furnace lining; 6, a relatively small loss of iron; 7, simplicity of means and method.

1 and 2. Conditions 1 and 2 are the chief factors (indeed, if we consider Bessemer steel alone, the only ones) in the low cost of steel manufacture. These two conditions, introduced into the production of wrought iron, would have a like effect upon its cost.

3. As already shown, the right cinder for the puddling process is largely produced from, and corrected by, the oxides forming the sides and bottom of the hearth. It is, however, evident that the purer oxides of iron are inert while in position and only become active after absorption into the bath. Hence, when suitable oxides are introduced in the form of cinder, ore and roll scale, there is no need of drawing upon the bottom and sides, provided these latter are of such nature as to resist the chemical action of the cinder and the temperature of the gases.

4. The proper regulation of the flame is essentially a simple matter, presenting difficulty only when associated with the motion of the furnace (if the latter be movable).

5. The lining offers a somewhat complex problem, both metallurgically and mechanically. It must resist the chemical action of a compound cinder; the friction of the mass as the iron comes to nature, and a somewhat high temperature. Moreover, in a mechanical furnace it must maintain its position throughout the movements of the furnace itself.

6. The minimum loss of iron is secured by the reduction of some of the iron oxide additions, resulting in an actual gain of weight of the puddled mass, over the pig charged, in an ordinary puddling furnace. This gain is exceeded by the final loss, due to the delay in the period of balling and drawing. By reducing the period of drawing, as by discharging the whole mass in one piece, this loss may be avoided and a possible net gain effected.

Wrought Iron Versus Steel.

The discussion was opened by C. E. Stafford of Chester, Pa., president of the Tidewater Steel Company, who referred to his experience in making special grades of wrought iron at the Shoenberger Works for horseshoes and in the employment of the Wuth process. Mr. Stafford described the Roe machine, having observed its operations. He emphasized the fact that, while the unit of product in ordinary puddling is from 180 to 200 pounds, it is in the case of the Roe puddler 4000, 5000 and 6000 pounds. The advantages of handling the product in large masses by machinery, with all that it implies, are therefore secured. In ordinary puddling there is a loss of 4 to 6 per cent., while in the Roe puddling process there is a gain in the furnace itself. Mr. Stafford expressed the conviction that the Roe process constitutes a great advance in economic metallurgy, and will take its place side by side with the open hearth process.

Dr. Dudley of Altoona, Pa., referred to the trend of returning favor from steel back to iron. Experience is crowding vigorously upon the users of metal, certain features of iron to the disadvantage of steel. Dr. Dudley dwelt more particularly upon the effects upon material of alternate bending stresses and upon the ratio between the resistance to ultimate stress and to fiber stress. It is the latter which is the measure of value of the material, and while the tensile strength of wrought iron may be much below that of steel the resistance to fiber stress may be the same. It is the localization of fiber stresses in steel which tells against it.

Dr. Cushman of the Department of Agriculture stated that that Department has been in receipt in recent years of many complaints concerning the lasting quality of the steel wire being put upon the market in recent years for fencing purposes. These have become so numerous and so pressing that the Department of Agriculture has intrusted Dr. Cushman with the duty of making an investigation. Laboratory tests indicated that the pitted steel wire produced in recent years contained high manganese, and it was at first believed that this was an adequate explanation. However, it did not hold good, and the idea has been suggested by observations made that it may

possibly be the distribution of the manganese in the metal which may be the seat of the trouble. Dr. Cushman suggested tentatively that catalytic action may have its share, but as yet the investigation has not led to anything definite.

Joseph Hartshorne of Pottstown, Pa., referred to Tegel's series of tests on torpedo metal, which seemed to indicate that the phosphorus in steel may have its influence on the rate of corrosion. Mr. Hartshorne quoted some striking personal experiences bearing on the relative oxidation of iron and steel. In 1885 the roof and sides of a new steel plant at Pottstown were built of iron. In 1890 that part which was immediately over the vessels had to be renewed and steel was selected. In 1893 this work had to be renewed again.

N. B. Wittman of Philadelphia reviewed the rapid decline in the number of puddling furnaces with the advent of mild steel. That movement has now been checked, however, and there is a distinct increase in the amount of wrought iron being called for by consumers and a number of new puddling furnaces are being built in eastern Pennsylvania and elsewhere. Mr. Wittman referred to the revulsion in favor of the iron nail, and in favor of iron sheets for roofing and other purposes. So long as wrought iron was being made in small quantities it had no chance, and it was exceedingly hard to handle the men engaged in puddling. But with the opportunity to utilize in the blast furnace, for wrought iron manufacture, ores and fuel having a wider range in composition, and with a mechanical puddling process handling large masses, there is a much wider field for wrought iron than before.

The afternoon session having been held in the National Museum, the party at its close inspected the institution under the guidance of its officers, who have ambitious plans for developing the Museum in the direction of economic work.

The Thursday morning session opened with the reading by Frank Lyman of a paper by George T. Wickes of Covington, Va., on

A Machine for Drawing Coke from Beehive Ovens.

The drawing of coke from beehive ovens by hand is exhausting labor, but as yet no satisfactory substitute has been found. The machine described in detail by Mr. Wickes has been in actual operation for a considerable period at the Continental works No. 1, at Uniontown, Pa. The advantages of machine work have been proven very important. Deeper charges can be handled and the greater speed is conducive to economy. The results obtained show that a standard oven can be readily drawn in 20 minutes, and the record thus far has been 10 minutes. It is figured on the basis of the data thus far gathered that the cost of drawing does not exceed 12 cents per ton. Since the ovens are watered by men who do nothing else, the excessive use of water is avoided and a better efficiency in operating the ovens is attained.

M. R. Campbell of Washington, who is connected with the St. Louis Government coal testing plant, presented a paper on a "Classification of Coals and Lignites Based Upon Ultimate Analysis." Prof. James F. Kemp of Columbia University summarized his paper on "The Copper Deposits of San Jose, Tamaulipas, Mexico," while A. C. Spencer of Washington presented a summary of his memoir on "Magmatic Vein Waters in Alaska."

The afternoon was given to an excursion to the ordnance proving grounds at Indian Head. On Friday the gun factory at the United States Navy Yard was visited.

This week the regular bimonthly settlement of the puddling and bar iron scales will likely be made at Detroit, Mich., where the Amalgamated Association is now in session. It is expected that the prices of shipments of bar iron in March and April will show an average of 1.50 cents, in which event wages of puddlers will be advanced 25 cents a ton, or from $5.12½, the present rate, to $5.37½. Finishers will also receive an advance of 2 per cent. James H. Nutt, labor commissioner of Republic Iron & Steel Company, is expected to go to Detroit this week to hold a conference with Amalgamated officials to arrange the puddling and bar iron scales for May and June.

Pacific Coast Transportation Interests.

SAN FRANCISCO, CAL., April 29, 1905.—The question of transportation via Panama is still a burning one in the mercantile community here and all along the coast. The Panama Commission can make rates from New York to Panama, but there the matter ends, and the Government has to arrange for the carriage of merchandise through without a break from New York to San Francisco, Portland and the Sound cities. For 50 years or more that business has been done by the Pacific Mail Steamship Company and it is still in the field. But should it be allowed to continue there and have the monopoly of the carrying trade between Panama, or, rather, Ancon, and the Pacific Coast of the United States?

At the first blush almost every one will be inclined to answer no, and this is the stand taken by some very prominent business men. On the other hand, a great part of the commercial community is decidedly in favor of allowing the Pacific Mail to have still the exclusive handling of through freight if it can in any way be legally done. This is the stand maintained by leading members of the Chamber of Commerce, which represents about 600 of the business men of the city, particularly those engaged in the importation of Eastern merchandise. The hardware and metal trades, on the whole, are particularly strong in supporting this view of the case, though there are some conspicuous exceptions.

At any rate, a committee of the Chamber of Commerce has been at work some time considering the matter and it has been preparing a report which will be made public within a day or two, and, though its recommendation is kept secret, a stand has been taken decidedly in favor of having the old company handle the through freight at this end. However this may be, the proportion of the freight rate to be added to that fixed by the Commission would be $2 per ton, as that is the rate that has been paid to the Pacific Mail for its services at this end. This does not seem excessive, and the only objection that could be made is that it would be unfair not to allow all an equal opportunity to have a share of it. The answer made by those interested is that this would drive the Pacific Mail out of business, as there is not enough freight to pay for running the line of steamers such as it has now on the route. Now, say the merchants who have regular service, "under other circumstances we would be without it," the result being that the receipts of merchandise by the merchants in the commercial cities of the coast would be irregular and rather calculated to destroy business than to help it. Of course those who think differently allow that there would be more or less inconvenience for quite a while, but then they say the amount of freight would be vastly increased and that in this way steady service could be maintained.

The condition of business at present writing is good—that is, the wholesale trade—though considerable complaint is heard from some of the retail lines in the city. The demand for builders' hardware continues uninterrupted and is likely to increase very largely, as the value of contracts recorded at the new City Hall for the past two months has been the largest ever known for the same part of the year, and as a rule one week exceeds another in this respect. For the months of March and April the value of contracts has been about $4,000,000, and should the year average this we would see $24,000,000 expended on new buildings in San Francisco in 1905. Now, while the most of this represents marble, brick, lumber and contractors' profits, the value of structural steel and builders' hardware promises a very large percentage on the whole. Our retail hardwaremen have therefore every reason to look forward to a good year. The representatives of Eastern manufacturers of structural steel will also do a good business unless, as happened in another year, their principals should be unable to supply the trade of this city and the coast. As regards the members of the wholesale trade, their calling and vocation is sure, and a very prosperous year is ahead of all the importers and jobbers of hardware on the coast. The same is true of other importers and jobbers in the metal lines. The demand for agricultural implements for the fall is good, and manufacturers and importers alike look forward to a satisfactory trade. J. O. L.

THE IRON AGE

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The Iron Age Directory.

Before the end of this week there will be mailed to every subscriber of *The Iron Age* a copy of the ninth edition of THE IRON AGE DIRECTORY, a book bound in red cloth, which is a classified index of all the goods manufactured by advertisers in *The Iron Age*. Subscribers who do not receive their copy will kindly notify us.

Unsatisfactory Trade Relations with Cuba.

The State Department is watching with considerable interest the proceedings in the Cuban Senate upon the bill now pending in that body providing for a uniform rate of duty on importations of agricultural and industrial machinery and railroad material. Under the terms of this measure such goods coming from the United States would pay the same rates imposed upon similar products imported from other countries. Should this bill become a law in its present form there is reason to believe that this Government would take prompt steps looking to the abrogation of the reciprocity convention.

When this measure was originally presented in the Cuban Congress it is understood to have provided for the free admission of American machinery and for a flat duty of 2 per cent. on machinery coming from other countries. While so low a rate of duty would afford but slight advantage to American manufacturers whose products would be free, yet its adoption could not be regarded by the United States authorities as involving a breach of the letter or spirit of the reciprocity treaty, for Cuba's right to adjust her tariff on any plane is incontestible, provided always that dutiable goods imported from the United States are granted a preference of at least 20 per cent.

The reciprocity treaty contains a provision which was incorporated at the instance of the State Department to meet just such an emergency as now seems imminent. Article X of the treaty provides that "It is hereby understood and agreed that in case of changes in the tariff of either country which deprive the other of the advantage which is represented by the percentages herein agreed upon, on the actual rates of the tariffs now in force, the country so deprived of this protection reserves the right to terminate its obligations under this convention after six months' notice to the other of its intention to arrest the operations thereof."

The power of the Cuban Congress to enact a law providing a flat rate of duty on machinery, &c., which must be paid by the United States and all other countries, is unquestionable, but it is obvious that such action nullifies the existing treaty and in effect repeals its terms as applied to a very important class of goods. It therefore goes without saying that the State Department will be fully justified in invoking the provisions of Article X if the pending bill is passed in its present form.

There are special reasons why the proposition involved in the measure now pending in the Cuban Senate is peculiarly obnoxious to this country. The exportation to Cuba of machinery and metal manufactures of all kinds constitutes a very important branch of our trade with the island, and one which the reciprocity treaty was counted upon to stimulate strongly. The available statistics indicate that this expectation has been realized to a very satisfactory extent. The treaty provides a reduction of 25 per cent. on all such goods, a margin that is believed to be adequate if the spirit of the concession is not nullified by manipulation of rates. The pending bill as originally introduced, placing American machinery on the free list but imposing a duty of only 2 per cent. on other machinery, would practically wipe out the advantage guaranteed by the reciprocity treaty. The passage of such a measure would be extremely distasteful to American manufacturers and exporters, but to eliminate the narrow margin of 2 per cent. altogether would certainly call for prompt action by the State Department.

The possibility that the reciprocity treaty may be abrogated is increased by the fact that the convention has been a disappointment to many American trades, although costing the United States nearly $1,000,000 a month in reduced revenues on Cuban sugar and tobacco. This loss of duty is equal to about one-half the current annual deficit in the Treasury receipts, which promises to be approximately $25,000,000. The last annual message of President Palma, recently submitted to the Cuban Congress, shows a gain in our share of the island's total imports for the last fiscal year, 1904, of only 2½ per cent., which is insignificant in view of the fact that the aggregate imports have been largely increased. The high prices paid for Cuban sugar in the United States have greatly increased the purchasing power of the Cubans, but they continue to supply as large a part of their needs from other than our own markets as before the treaty went into force.

The British "Stop Day" Case.

Recent decisions of the British courts in cases involving the relations of employer and employee are cited and with important effect in similar American cases, which have come to be more frequent during the past few years. Employers and the unions and the attorneys of both are keeping sharp track of all such cases, especially where they are decided before the House of Lords, which is the English equivalent of the Supreme Court of the United States. The "stop day" case, as it is called, is one of the most recent of the English decisions and is considered to be of unusual importance as defining to an extent the words "just cause and excuse" in the maxim that it is unlawful for one man to advise and cause another to break a contract unless he has just cause and excuse. The decision against the union is one that will render labor leaders more cautious in bringing about violations of contracts between members and their employers, for it is wholly in favor of the employers and carries with it large financial damages.

The case was brought by a number of coal owners of South Wales against the South Wales Miners' Federation for wrongfully and maliciously procuring and inducing workmen employed in the plaintiffs' collieries to break their contract of service. In 1900 the Federation passed a vote that is was "unanimously resolved to order a stop day on Friday next," the purpose being to keep up the price of coal by diminishing the output. The stop day is a working day upon which no work is done. The employers protested and gave warning that legal proceedings would be instituted if the action was repeated. Having in mind other recent judicial decisions, the Federation

realized that it would be dangerous for its Executive Council as such to order a stop day and consequently disguised the identity of its members by calling them workmen's members of the Sliding Scale Committee. Under this guise several stop days were ordered, or, as it was termed by the defendant in the suit, were advised. During the trial of the case the defendant admitted that the Executive Council had advised the men to break their contracts, but claimed that it was a justifiable action and that it was its duty to advise and assist the men. The plaintiffs claimed that the "advice" was in reality a command. The case was sharply contested, the Federation winning in the lower court but losing in the Court of Appeals and before the House of Lords. It was held that this form of advice is illegal and actionable, and the Miners' Federation will have to pay heavy damages because of the action of its leaders.

The principle involved is very important. It may mean a great deal in many labor cases yet to be brought. It places serious restrictions upon the doings of the officers of a labor union where a contract exists between the union and the employers. With the large funds that some of the unions are known to possess, because they use the fact to intimidate the employer, actions such as these will largely diminish the size of this very important form of sinew of war. The root of most labor evils is with the union officers, most of whom are wholly incompetent either from selfish motive or lack of natural ability. If the law can be brought to the surface, so that all may know—both employer and employee and the union representatives of the employee—that the officer of a union may not influence the members to violate their agreements with their employers without sure liability to financial damages, then will a great good have been done for both employer and employee. Such an understanding would make the wage contract a much more common practice, and while this might directly work for the cause of the labor union, it would be a union robbed of much that makes it a menace to industry.

The Crane Age.

Modern labor saving machines are sometimes blamed for lowering the standard of the skilled workman by transforming him into a mere automaton—a droning machine tender. Undoubtedly in some crafts there is less call for men of manual dexterity than there was before the invention of labor saving devices, leading to a decreased demand for all round mechanics and an increased demand for men of only sufficient intelligence to guide an almost sentient machine. On the other hand, many types of labor saving devices have counteracted this tendency by offering mechanical means for doing the drudgery of a shop, making necessary a higer average of intelligence than before. Pneumatic drills and hammers and hydraulic and electric riveters are in this class, as skill and judgment rather than mere brute strength and endurance are called for in their operation. But the greatest agency for relieving the workman of life destroying drudgery is undoubtedly the electric traveling crane. This device, together with cranes and hoists generally, has relieved the workers of the necessity of heavy lifting and laborious carrying, leaving them to devote all their energy and skill to the fabrication of the work in hand. Electrical tools generally raise the average of intelligence and the average of pay in any shop in which they are used, for their care and operation call for a high degree of skill and judgment and their efficiency reduces the number of unskilled operatives necessary in the plant. In a plant equipped with cranes and hoists heavy materials are moved forward through their various stages of development, from raw state to finished product, without being lifted or carried by human hands, saving time, labor and confusion. So widely is their value recognized that the industry devoted to their construction, though one of the youngest, is also one of the strongest in the metal working trades.

The Condition of the Iron Trade.

In the midst of the rush of present day production, when blast furnaces and finishing mills are making record runs, the question arises, How long can it last? Of course this question is always asked whenever business improves. Activity is not a permanent condition and a reaction must come sooner or later.

It has been generally understood that the present finishing capacity of American steel mills greatly exceeds the consuming capacity of the country and is also in excess of the total available supply of domestic pig iron. And yet there is apparently a larger proportion of blast furnace capacity idle than of finishing mill capacity. A review of the general industrial situation would seem to indicate that the consumers of iron and steel, outside of the railroads, which are buying heavily, are not realizing a measure of prosperity in proportion to that enjoyed by the producers of their raw and finished materials. While new records of production are being made in pig iron, steel billets and other rolled products, and while the material thus produced seems to find a ready market, the consumers as a whole figure their increase over last year at only 10 to 20 per cent. A natural explanation of this paradox is that the consuming world has been stimulated by a rising market into overbuying. If this is the case a reaction is to be expected, because consumers cannot indefinitely buy, or agree to buy, more materials than they will require. Another explanation of the apparently unequal consumption of iron and steel lies in the fact that eight months ago, as the result of a long period of falling markets, there were practically no stocks in the hands of consumers, who had been buying from hand to mouth for months previous. Last fall, therefore, when powerful producing interests sent out word that advances would be made, and at the same time evinced a willingness to take contracts at the existing low prices, the buying trade not only bought or contracted for sufficient material to supply its normal requirements, but covered itself also for liberal stocks. Then, as one advance followed another and a feeling of optimism became general after the Presidential election was settled, larger and larger orders were placed for iron and steel of every description. It is these orders and contracts that are now being filled by overcrowded furnaces and mills, and exactly to the extent to which overbuying exists the reaction will set in.

Already pig iron is easier, particularly the foundry grades for second half delivery. Scrap iron has shown marked weakness, especially in the West, as iron bar mills, the largest consumers, find that there is so great a surplus of steel bars already contracted for at the low prices of last fall that they can find but little market for iron bars even at $1 to $2 a ton below the present official price for steel. The same situation is beginning to develop in nails and wire products, in which excess tonnages on old low priced contracts, particularly those held by jobbers, are being forced on the market at concessions. Meanwhile a canvass of the retail trade will develop the fact that many of the stronger merchants have good stocks of low priced nails and barb wire. Concessions from recent quotations are also being made on wrought pipe and sheets.

Arguing from these premises, the claim might be made that the expected reaction is already at hand and that the boom is over. Possibly it is. One fact at least seems to be settled beyond dispute, and that is that this country has demonstrated its ability to take care of a sudden expansion in its iron and steel requirements even if such an expansion should run beyond anything previously experienced. For a time this spring the necessity of importations seemed imminent, but the home producers were equal to the exigency and the demand has been overtaken. As to whether this means much of a decline in prices remains to be seen. No troublesome financial or political complication has arisen to disturb business interests. Optimists point to the great wealth of the country, its amazing growth in population and consuming capacity, its vast unfilled wants resulting from the long period of underbuying that immediately preceded the present wave of prosperity, the splendid prospects for wheat and crops generally during the present year, the rapidly growing foreign trade of this New World Power and to the large earnings and dividends of industrial enterprises generally. They argue that the great demand from the agricultural districts is yet to come, and that as soon as the winter wheat crop is reasonably safe a heavy trade in merchandise of all kinds is surely to be expected. Over and over have the prosperous farmers of the West come to the relief of overstocked merchants and manufacturers. Thus, while the future may be uncertain, it nevertheless abounds with hopeful influences.

Cheaper Alcohol for Manufacturing Purposes.

WASHINGTON, D. C., May 9, 1905.—The Commissioner of Internal Revenue has under consideration a measure of the highest importance to the business interests of the country, and one which has a broad bearing upon the question of the necessity for tariff legislation in the coming Congress. It is a bill drawn by a committee representing manufacturers using alcohol for industrial purposes, and is designed to permit denaturized grain spirits to be employed in manufacturing free of tax, a privilege that is now accorded in nearly all the leading countries of Europe. The project as formulated in this bill is not only of interest to every consumer of alcohol in the arts, or as fuel for automobiles, power boats, small engines, &c., but also to all interests that would be affected by a revision of the tariff, which it is claimed would be unnecessary if Congress should act favorably upon this measure. Notwithstanding the fact that the principal feature of the bill embodies an exemption from tax of methylated alcohol, there are other important provisions which it is claimed would add not less than $27,000,000 to the revenue now derived from distilled spirits, thereby wiping out the current Treasury deficit, which for the fiscal year 1905 will approximate $23,000,000.

A Widespread Movement.

Many manufacturers in all parts of the country, including those employing alcohol in the manufacture of enamels, lacquers, bronzes, explosives of all kinds and a thousand and one articles in the production of which grain spirits are or would be used if sufficiently cheap, have for a long period urged upon Congress a revision of the internal revenue laws so as to provide denaturized alcohol free of tax and to reduce the tax on pure grain spirits when employed for purposes to which methylated spirits are unsuited. With this object in view, Representative Boutell of Illinois introduced two bills in the last Congress, but they were not reported by the Ways and Means Committee. The necessity for such legislation and the benefits which would follow its enactment are universally understood and admitted, and the only objection made by the Treasury officials and the leaders in Congress is the possible loss of revenue which they fear would result. In view of the present condition of the national revenues, this doubt as to the effect of providing for cheaper alcohol has served to delay action by Congress, notwithstanding the almost unanimous sentiment, both in the Senate and House, in favor of a more liberal policy in regard to this important industrial material.

The advocates of free denaturized alcohol do not concede that the measures proposed by them—the removal of the tax from alcohol rendered unfit for use as a beverage, and the reduction of the internal revenue tax on distilled spirits—would in reality cause any decrease in the revenue derived from this source, but they recognize the fact that it is necessary to provide for any possible deficiency which may arise. It is therefore proposed to accompany the legislation for cheaper alcohol with a provision imposing an additional tax on rectified or compounded distilled spirits used solely as a beverage, which will yield ample revenue to meet any decrease through the use of untaxed denaturized alcohol, or a reduced tax rate on distilled spirits used for other than beverage purposes.

Features of the Bill.

The principal features of the bill drafted by the committee of manufacturers and now before the Commissioner of Internal Revenue are as follows:

1. The exemption from taxation of alcohol rendered unfit for use as a beverage before removal from distillery warehouse.
2. The reduction of the tax on high proof alcohol and high proof cologne spirits to 70 cents per proof gallon.
3. The reduction of the tax on all other forms of distilled spirits to 80 cents per proof gallon.
4. The imposition of an additional tax of 60 cents per proof gallon on all blended or compounded distilled beverage spirits.
5. The compulsory storage in bond for four years of all distilled spirits other than high proof alcohol, fruit brandies and high proof cologne spirits, and rum and gin under special conditions.

It is an interesting fact that the committee of manufacturers who have formulated this bill derive the basic principle of the increased tax on compounded spirits from a statute adopted by the Philippine Commission last July for the taxation of distilled spirits. Special provision is also made in the Philippine law for a very low tax rate on distilled spirits when mixed with methyl alcohol or other substances so as to render them unfit for use as a beverage. Notwithstanding the urgent need for revenue, which has made necessary the adoption of export taxes and other unusual forms of taxation, it is believed that the encouragement of the use of denaturized alcohol for industrial purposes was of much more importance than the revenue which might have been derived from a higher tax rate. It is worthy of comment that we should have so readily discovered the wisdom of these laws for our Philippine possessions, while we are still hesitating to adopt similar legislation for the benefit of our own people.

Estimated Revenues.

The present annual revenue from distilled spirits of all kinds is about $130,000,000. It is estimated that under the proposed bill there will be a normal increase in the consumption of compounded spirits, while the consumption of tax paid pure alcohol at 70 cents per gallon—a reduction of 40 cents from the present rate—would increase the present consumption of 5,000,000 gallons to at least 15,000,000 gallons, certainly a very conservative estimate. The aggregate estimated revenue derived under the bill, based on the figures for the last fiscal year, is $157,183,889, or $2.,619,647 more than that actually obtained.

The Committee of Manufacturers therefore claim that as this legislation will give the Government increased revenues, at the same time making their collection easier and more certain, there remains no reason why Congress should not take prompt and favorable action on the proposed bill. Its enactment will relieve many important industries of the burden of the present excessive tax on alcohol, will cheapen the cost of many articles of general use, will make possible the development of many new industries from which the high price of alcohol now excludes our manufacturers and will create additional markets for corn and other farm products used in the production of spirits.

W. L. C.

The Carnegie Steel Company of Pittsburgh has plans under way for the building of a hot metal bridge connecting the Donora and Monessen plants. If the bridge is built it will be used to carry hot metal from the two blast furnaces at Donora to the finishing mills at Monessen.

Core Binder Tests.

J. S. Robeson, president of the American Glutrose Company, Camden, N. J., read an interesting paper, entitled "Some Core Binder Troubles," before the Philadelphia Foundrymen's Association May 3, from which the following extracts are taken:

In an endeavor to find out why different sands give different results with different binders my company has had a great number of tests made for strength, and these results or, rather, some of them, are shown here:

Tests of Pressed Cores.

No.	Sands.	Class.	Binder.	Binder to sand in volume.	Water to sand in volume.	Tensile strength. Pounds per square inch.	Remarks.
1.	2 parts New England Bank.	½ round, ½ angular, glassy.	Gluetrin	1 to 25	.....	3.10	
2.	2 parts Sodus Point.	½ round, ½ angular, glassy.	Flour	1 to 15	.....	0.44	Weak green.
3.	1 part Lumberton.	Coarse, loamy.	Gluetrin	1 to 50	5 to 50	1.61	
4.			Flour	1 to 12	6 to 50	0.87	
5.			Gluetrin	1 to 50	5 to 50	1.34	
6.			Molasses	1 to 50	5 to 50	0.93	
7.			Pro. No. 3d.	1 to 30	6 to 50	0.00	
8.	8 parts Maurice River, 1 part Ganister, 1 part clay.	Fine angular, slightly loamy, angular, coarse.	Gluetrin	1 to 70	5 to 50	0.87	
9.			Molasses	1 to 80	5 to 50	0.00	
10.			Gluetrin	1 to 60	5 to 50	0.93	
11.	1 part New England Bank.	½ round, ½ angular, glassy.	Flour	1 to 12	6 to 50	0.93	Rammed.
12.			Pro. No. 3d.	1 to 30	6 to 50	0.47	Rammed.
13.			Gluetrin	1 to 25	3 to 50	1.43	
14.	1 part Sodus Point.	½ round, ½ angular, glassy.	Gluetrin	1 to 25	4 to 50	2.61	
15.			Gluetrin	1 to 25	5 to 50	3.34	Note effect
16.	2 parts Lumberton.	Coarse, loamy.	Flour	1 to 15	4 to 50	0.21	of water.
17.			Flour	1 to 15	5 to 50	0.46	
18.			Flour	1 to 15	6 to 50	1.12	
19.			Dextrine	1 to 50	6 to 50	0.47	
20.			Gluetrin	1 to 50	5 to 50	1.40	
21.	Sodus Point.	½ angular, ½ round, glassy.	Pro. No. 2d.	1 to 20	6 to 50	1.58	
22.			Pro. No. 2d.	1 to 40	6 to 50	0.00	
23.			Gluetrin	1 to 60	5 to 50	0.25	
24.	3 parts Sodus Point. 3 parts Tullytown	½ round, ½ angular, fine, loamy.	Dextrine	1 to 40	6 to 50	0.60	
25.	2 parts old sand.		Gluetrin	1 to 60	5 to 50	0.85	
26.			Pro. No. 1d.	1 to 60	6 to 50	0.00	Pressed.
27.			Gluetrin	1 to 60	5 to 50	0.34	Pressed.
28.	Tullytown	Fine, loamy.	Pro. No. 1d.	1 to 60	6 to 50	0.47	Rammed.
29.			Gluetrin	1 to 60	5 to 50	1.48	Rammed.
30.	1 part Lumberton, 1 part Millville, 2 parts old sand.	Coarse loamy.	Gluetrin	1 to 50	5 to 50	1.30	

Tests of Rammed Cores.

No.	Sands.	Class.	Binder.	Binder to sand in volume.	Water to sand in volume.	Tensile strength. Pounds per square inch.	Remarks.
31.	1 part Pittsburgh River, 1 part Allegheny loam.		Gluetrin	1 to 50	5 to 50	2.14	
32.	1 part Pittsburgh River, 1 part Pittsburgh bank.		Gluetrin	1 to 50	5 to 50	3.48	
33.	Maurice River.	Fine, angular, and slightly loamy	Gluetrin	1 to 100	4.5 to 50	1.95	
34.	Maurice River.		Rosin	1 to 10	5.5 to 50	2.09	
35.	Maurice River.		Pro. No. 1d.	1 to 20	5.5 to 50	2.02	
36.	Maurice River.		Pro. No. 2d.	1 to 20	5.5 to 50	1.46	
37.	Maurice River.		Flour	1 to 10	5.5 to 50	1.12	
38.	Maurice River.	Fine, angular, slightly loamy.	Gluetrin	1 to 50	5 to 50	6.47	
39.	Dunbar		Gluetrin	1 to 50	5 to 50	6.18	
40.	Ithaca glass.	Round, glassy.	Gluetrin	1 to 50	5 to 50	2.19	
41.	New England bank.	½ round, ½ angular, glassy.	Gluetrin	1 to 50	5 to 50	2.09	
42.	Welsh Mt. Ganister.	Angular, coarse.	Gluetrin	1 to 50	5 to 50	2.02	
43	New Jersey glass.		Gluetrin	1 to 50	5 to 50	1.98	
44.	Fine molding Pittsburgh.	Fine, loamy.	Gluetrin	1 to 50	5 to 50	1.95	
45.	Allegheny loam.	Loamy, coarse.	Gluetrin	1 to 50	5 to 50	1.83	
46.	Latta Brook No. 1.		Gluetrin	1 to 50	5 to 50	1.68	
47.	Tullytown	Fine, loamy.	Gluetrin	1 to 50	5 to 50	1.58	
48.	Albany	Fine, loamy.	Gluetrin	1 to 50	5 to 50	1.46	
49.	Old sand.		Gluetrin	1 to 50	5 to 50	1.25	
50.	Pittsburgh River.	Round, glassy.	Gluetrin	1 to 50	5 to 50	1.12	
51.	Millville	Coarse, loamy.	Gluetrin	1 to 50	5 to 50	1.09	
52.	Sodus Point.	½ round, ½ angular, glassy.	Gluetrin	1 to 50	5 to 50	0.87	
53.	Pittsburgh bank.	Coarse, loamy.	Gluetrin	1 to 50	5 to 50	0.75	
54.	Lumberton	Coarse, loamy.	Gluetrin	1 to 50	5 to 50	0.71	
55.	Scranton		Gluetrin	1 to 50	5 to 50	0.56	
56.	Rockaway Beach.	½ round, ½ angular, glassy.	Gluetrin	1 to 50	5 to 50	0.56	
57.	White silica.		Gluetrin	1 to 50	5 to 50	0.56	

In making these strength tests a ⅞-inch round core made in an iron box has been used, either pressed or rammed, baked at a fixed temperature, and then supported on edges 8 inches apart, weights being loaded at the center until broken and the results expressed in pounds per square inch.

I wish now to draw your attention to some of the results, and though I cannot offer you any explanation as to why there is such a difference in the strength of the different sands with the same binder (though this I hope to do some time in the future), the mere fact will, I hope, prove of interest and of value.

In this series, running from 38 to 57, one part of the same binder, gluetrin, mixed with 5 parts of water, has been added to 50 parts of each of these various kinds of sand. In these tests, in order to make the work as nearly uniform as possible, the sands were all dried; hence the amount of water used is more than would be required in the foundry; probably two or three parts of water would be sufficient. Note the great difference in strength ranging from the yellow silica or Maurice River sand, which will carry 6½ pounds to the square inch, down to the Scranton, Rockaway Beach and white silica sands, that will support only ½ pound to the square inch.

As previously noted, the question of strength, while dependent on the loam or clay contained and the shape of the grains, is probably more largely governed by the proportional size of the grains.

And by this I mean not that the sand is what might be classed as coarse, medium or fine, but that the sand is a mixture of different sizes, and as the proportion of each size is so as to fill up the voids more completely the

stronger will the sand be, whether the sand as a whole may or may not be classed as fine, medium or coarse.

Tests Nos. 31 and 32 are very good examples of the increase in strength by the mixing of different sizes and of the clay effect. These two mixes are in common use in the Pittsburgh district, and were not especially selected, but came right along in our regular work of making tests to determine the proper mixtures and proportions for our own customers.

In No. 31 the Pittsburgh River sand has a strength by itself of 1.12 pounds and the Allegheny loam of 1.83 pounds. As these are used in equal parts it would seem that the test of the core from the mixed sand would be the average, or 1.47 pounds, but it is much higher, 2.14 pounds. This is even more noticeable in No. 32, where the average of the two sands is only 0.94 pound, and yet the mixed core shows 3.48 pounds.

In tests Nos. 33 to 37, inclusive, the same sand is used with different binders, and this permits of some comparison as to costs. As these mixtures, in accordance with the common practice of the foundry, are made by bulk or measure and not by weight, it has been necessary to find what a fixed measure, such as a quart, of these various materials weighs.

Yellow silica, the sand used in these five tests, weighs 2 pounds 10½ ounces to the quart, or 842 quarts to the ton of 2240 pounds. The gluetrin, at 1 to 100 and 15 cents per gallon, costs 32 cents for each ton of sand mixed. The rosin, at 1 to 10 and $3.25 per barrel, costs $1.30.

Pro. No. 1d is a proprietary dry compound selling at 2.5 cents per pound, and the amount to produce this result costs $1.37 per ton of core sand mixed. Pro. No. 2d sells at 1¼ cents a pound and the cost per ton of core sand mixed is 82 cents. Although the same amount of Nos. 1 and 2 was used, and the latter sells for half the price per pound of the former, the actual cost per ton is more than half of No. 1. This because No. 1 weighs 1.3 pounds to the quart and No. 2 1.56 pounds.

This difference in weight is well worth watching when you buy by the pound and use by the quart. Foundry flour, for instance, will vary from 1.1 pounds to the quart, the figure I use in these calculations, up to 1.6 pounds, and I am willing to go on record as saying that the heavier it is the weaker it is. The flour at $25 per ton costs $1.16 for the amount used in each ton of core sand.

In the series Nos. 1 to 7 this sand mixture runs 816 quarts to the ton. Gluetrin, at 1 to 50, costs 61 cents; flour, at 1 to 12, costs 93 cents.

Pro. No. 3d is recommended to be used with sands generally at 1 to 30, but the cores made with this mixture would not support their own weight.

In the sand mixture covering tests Nos. 10 to 20 this dry compound, costing 47 cents per ton of core sand mixed, gave about half the strength of gluetrin, costing 53 cents, and flour, giving the same strength, costing 98 cents.

It should be noted in this connection that the flour and compound cores were rammed, while the gluetrin core was pressed.

In the tests from Nos. 13 to 18 I would draw your particular attention to the very marked effect on the strength caused by the increase in the water addition.

It is the deductions that can be drawn from these results much more than the actual figures as to the strength or perhaps even as to the cost that are of real value.

Given a certain strength that it is necessary for a core to have in order to stand up to the work, then the smaller the amount of the binder required the less danger is there from gas, simply because there is less stuff there to make gas, and this means also fewer rods, arbors and nails. Likewise the more easily will the core clean out after casting, because there is less material for the heat to burn.

B. F. Jones, president of the Jones & Laughlin Steel Company, at Pittsburgh, denies that he is connected in any way with a new concern that proposes to build a steel car plant at Ambridge, near the works of the American Bridge Company.

Lake Superior Mines Sold.

DULUTH, MINN., May 6, 1905.—Several weeks ago announcement was made of the pending sale of several of the so-called Sellwood mines to various parties, including the Lackawanna Steel Company and the Jones & Laughlin Steel Company. These sales have now been closed and to-day at Duluth meetings of the various companies were held to transfer the stocks from Mr. Sellwood and associates to the new owners, to accept resignations and to elect representatives of the new interests.

The largest of these mines is the Leetonia, and it has a very important ore body of good grade running up to more than 10,000,000 tons in a solid block. Leetonia ore is a 61 per cent. and just on the edge above the Bessemer limit. It is rather high in moisture, up to 13 per cent., and is under 4 per cent. silica. Leetonia Bessemer is shipped at 0.045 per cent. phosphorus. The firm of Butler Brothers is at work stripping this mine under a very large contract that will continue for some years, and has a contract for mining 1,000,000 tons of ore at 10 cents a ton, by steam shovel, of course. The mine is located west of Hibbing, in the west half of the northeast of section 10-57-21, and the ownership of the land is in the Great Northern Railroad, which gets the haul of ore to the lake. The price for this mine was $2,000,000 and it is now the property of the Interstate Iron Company, the mine end in Minnesota for the Jones & Laughlin Steel Company. Leetonia has mined 450,000 tons in the three years it has been operating and will make about as large an output this year as for the entire previous period. The ore is coarse and desirable for furnace use.

Croxton mine, situated in the southwest of the southwest section 13-58-20, has been sold to the Cherry Valley Iron Company, which was a minority holder with Mr. Sellwood. The price was on the basis of $750,000 for the mine. There are 45 acres in the property and the ore lies along the south side of the tract. It has been stripped and is mined by the milling process. Croxton ore is of excellent grade and coarse, running about 59 per cent. iron, 0.057 per cent. phosphorus, 6 per cent. silica and 10 per cent. moisture. The mine is not large as judged by Mesaba standards. The ownership of this land is in Mrs. Mary Syme of Wisconsin, who holds several tracts in that part of the range. It has been shipping over the Great Northern Railroad and has produced to this time 120,000 tons.

The two Sellwood mines on the Gogebic range, Sunday Lake and Brotherton, have been taken over by the Lackawanna Steel Company, and at a price for the former of $10 per share, or $400,000 for the entire property. The Brotherton was taken at $7 per share, or $560,000 for the mine. It is understood that about 500,000 tons of excellent standard Gogebic Bessemer ore are shown up in this mine, and if so the price is a very reasonable one, for that ore is worth more than $1 a ton to take out of the ground. Sunday Lake has not so much, but the character is virtually the same as the other. Both are very wet and their combined gross production to date has been 2,000,000 tons, of which Brotherton has been chief producer. These ores are self fluxing and analyses run about 62.25 per cent. iron, 0.025 per cent. phosphorus, 7.50 per cent. silica and between 8.50 and 8.75 per cent. moisture. Stocks of these companies were somewhat scattered, but the majority was owned by Sellwood and immediate associates at Duluth, with some Cleveland and Detroit holders. Both mines will be worked actively this year and both are now removed from the active market, for the new owner will conserve the ore reserves for its own use. The two were among the very few Gogebic mines from which the independent consumer was able to buy a standard old range Bessemer, and one of the striking facts of this sale is the position in which it helps to put non-mining ore consumers.

Mr. Sellwood still holds the majority of the La Rue, Cass and Morrow mines, and an undeveloped property which is quite important and will probably come in later as a mining proposition. He receives about $1,750,000 as his share of the proceeds of these sales, and none of his multitude of friends throughout the lake mining and

shipping regions but will rejoice that he has been able to hold through a period of adversity such as he had two years ago, when he was most cruelly robbed, and has come out with a handsome fortune, which represents the fruits of a long life of the utmost activity and skill in his chosen profession, begun as a mere child in Cornwall.

In addition to the recently acquired properties on the Mesaba the Jones & Laughlin Steel Company has now taken the Father Hennepin mine, on the Wisconsin end of the Gogebic range, and is exploring it for extensions of the ore body. This old mine lies 5 miles west from Hurley and adjoins the Montreal, which has a long and reasonably active career.

Menominee Range Developments.

On the Menominee range the Oliver Iron Mining Company is to ship the small stock pile of Columbia mine and will then probably abandon the property. It has been a small producer for some time, but for years the Columbia was one of the foremost mines of Crystal Falls.

At Old Breen the Mineral Mining Company has begun work and is erecting buildings and stripping a piece of ground about 100 feet square where the ore formation is overlaid with earth to the thickness of only about 2 feet. This mine should be a shipper by June next. The shipment of stock pile ore as early as this is a notable instance of the sharp demand for ore at the lower lake ports. Usually all ore in stock is held over for a time until the frost is pretty well out of the mass, but now at about every mine of the Menominee range steam shovels are working in stock. Indeed, this is true not alone of the Menominee, but of the other ranges as well, and that is the reason that shipments have been able to jump almost in a day to a full season rate. On the Gogebic steam shovel shipments began at a date earlier than was ever known and are in very heavy tonnage now.

The Cleveland Cliffs Iron Company

is pushing its Ashland mine this year to a considerable extent and will make large shipments from there. It is rushing work at its Maas and Negaunee mines, and the former will be in shape for production in a short time. The Nagaunee will make a bigger output than for any preceding year. The company's exploratory work in the Marquette district is progressing fairly well, though a number of drills that had been operating in an untried part of the field have been taken off.

This company is now rebuilding and enlarging its chemical plant at the Gladstone Furnace and expects to be in readiness to start up there by midsummer. The Pioneer Furnace has been running at full time and very satisfactorily for a long period. Nothing is being done with its Mesaba properties, and there is little hope that it will be mining there this year, though some exploratory work may be undertaken later. The old mines of the company at Ishpeming, the Cliffs, Lake Salisbury and others are doing well and will make a bigger tonnage than last year—probably as large as in any previous season.

The Marquette & Southeastern Railroad, which is owned by the Cleveland Cliffs Iron Company, is to build an extension from Marquette to Lake Independence. This will run westerly along the lake and will open a timbered district 25 miles wide and 40 miles long, through which the company owns a vast tract of land heavily timbered with hard woods. All this region was "lumbered" years ago—that is, the pine that was then thought to be good was taken off—but there is still much pine, while the immense values in hard woods were never touched. This gives the Cleveland Cliffs Company an available acreage of hard wood lands east, south and west from Marquette, the importance of which can scarcely be realized, especially to a company that is and proposes to remain in the business of making charcoal pig iron and the wood acids. D. E. W.

The Baltimore & Ohio Railroad has awarded contracts for 10,000 freight cars to cost in the aggregate about $12,000,000. The distribution of these contracts is stated to be as follows: American Car & Foundry Company, 2000 steel hoppers and 250 refrigerator cars; Pressed Steel Car Company, 1000 steel hoppers and 1000 twin gondolas; Western Steel Car & Foundry Company, 1000 box cars; South Baltimore Steel Car & Foundry Company, 1000 box cars; Standard Steel Car Company, 1500 steel gondolas; Cambria Steel Company, 2000 steel twin gondolas; Rogers Ballast Car Company, 250 ballast cars.

PERSONAL.

Clyde M. Carr, vice-president and secretary of Joseph T. Ryerson & Son, Chicago, has recently returned from a two months' rest in California.

W. G. Schron, who has been in the employ of the Westinghouse Machine Company as a salesman, recently entered the service of the Allis-Chalmers Company of Milwaukee. He will make his headquarters at the Pittsburgh office, and devote his attention to the sale of gas engines, steam engines and steam turbines.

The directors of the American Radiator Company have elected Charles H. Hodges, formerly treasurer of the company, second vice-president to succeed Edward A. Sumner. Charles M. Parker was elected treasurer.

John D. Hibbard, the retiring president of the Chicago Metal Trades Association, was presented last week by the association members with a handsome roll-top desk and appurtenances, the desk being fitted with a silver plate suitably engraved. He is succeeded in his office by H. H. Latham, president of the Latham Machinery Company.

The J. M. Robinson Mfg. Company, Cincinnati, Ohio, manufacturer of sheet metal working machinery, cornice brakes, presses, dies, &c., was reorganized May 1, James M. Robinson, one of the original founders with Frank Thomas, Sr., 40 years ago, retiring from active management. Frank Johannigman, for many years associated with the J. W. Foley Company and later its president, assumes the controlling interest in the reorganized company; William Kapps, upward of 25 years with the old concern, becomes vice-president, and Clarence N. Frey, also for many years with the old company, is secretary and treasurer. The business will be removed about July 1 to a new plant the company is erecting on Spring Grove avenue and Sassafras street, the building being a two-story brick structure 60 x 200 feet. Mr. Robinson has for many years been prominent as one of the active members of the local Union High School Board, serving as its president for several terms, and is still an active member. He still remains one of the directors of the concern and this bespeaks for the new *régime* the consideration of his business acquaintances.

Cyrus Robinson, formerly vice-president and general manager of the Power & Mining Machinery Company, now has his headquarters in the offices of the Arizona Smelting Company, 71 Broadway, New York, of which company he is consulting engineer.

Richard B. Carr of Pittsburgh, for some years connected with the general sales department of the Carnegie Steel Company, has gone to San Francisco to succeed William B. Isaacs as manager of sales for the company on the Pacific Coast.

Arthur D. Thomas, formerly with the Lorain Steel Company, Lorain, Ohio, has been appointed superintendent of the rolling mill of the Interstate Iron & Steel Company, at East Chicago, Ind.

J. G. White & Co., Incorporated, engineer and contractor, 49 Exchange place, New York City, announces that it has secured Albert S. Crane as chief hydraulic engineer.

Towner K. Webster, president of the Webster Mfg. Company, Chicago, has been appointed by the Mayor one of a committee of three to investigate the present strike. Mr. Webster's associates are Prof. Graham Taylor, head of Chicago Commons, and William C. Boyden, an attorney.

David Thomas, recently with the Reading Iron Works (and previously at Danville, Pa), has been appointed general manager of the Logan Iron & Steel Company at Burnham, Pa. The owners of this mill have spent a large amount of money in bringing their plant up to a condition of high efficiency.

Pig Iron Production Slightly Increased.

Stocks Show the First Increase Since August, 1904.

Since April was a short month the total make of anthracite and coke pig was not quite up to that of March, but when that fact is taken into account the output was slightly larger. The further additions to active plants make it a practical certainty that the production for May, including charcoal pig, will overrun 2,000,000 tons.

For the first time since August of last year there has been an increase in the stocks of pig iron carried by merchant furnaces, the quantity being slightly above 17,000 tons. This proves that the delicately poised balance between production and consumption is now tilting against the producer, the increase coming almost entirely from the Southern group.

The statistics of production given in the following table are compiled from the official reports of all the furnaces in the country except two, whose aggregate output does not exceed 4700 tons per month:

Monthly Pig Iron Production.

	December. (31 days)	January. (31 days)	February. (28 days)	March. (31 days)	April. (30 days)
New York....	72,752	78,864	66,185	96,180	103,353
New Jersey...	21,464	23,841	20,487	29,292	31,353
Lehigh Valley	44,581	53,207	49,407	55,319	54,289
Schuylkill Val.	45,335	44,956	39,102	44,998	43,488
Lower Susquehanna and Lebanon Val.	39,999	37,318	34,161	39,590	58,090
Pittsburgh dis.	412,433	461,490	411,135	510,265	490,830
Shenango Val.	131,417	144,278	131,748	155,266	164,698
West. Penn...	92,478	98,765	96,551	97,569	96,622
Md., Va. and Kentucky ...	66,165	72,601	62,170	78,306	70,739
Wheeling dis.	86,306	105,995	93,865	99,737	103,140
Mahoning Val.	149,397	161,462	145,590	154,140	143,428
Cent. and No.	103,522	121,902	97,638	123,438	130,733
Hocking Valley and Hanging Rock	27,336	27,730	22,094	30,539	31,388
Ill.,Mich.,Minn., Wis., Mo. and Col.	184,873	200,631	199,104	253,325	234,410
Alabama	114,670	117,575	99,624	127,316	127,810
Tennessee, No. Carolina and Georgia	23,339	31,232	28,482	40,984	37,670
Totals....	1,616,007	1,781,847	1,597,343	1,936,264	1,922,041

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Ashland, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of product month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1903.	1904.	1905.	1904.	1905.
January.....	.....	502,994	1,129,042	6,673	21,002
February....	.....	756,260	1,027,937	12,961	22,431
March.....	.....	913,412	1,232,255	23,128	21,280
April	966,850	974,096	1,222,710	29,145	20,038
May 1,037,325		927,534	.....	25,755	.....
June 1,021,839		788,822	.....	24,950	.....
July	987,855	694,892	.....	27,284	.....
August.....	993,564	747,570	.....	19,280	.....
September...	956,363	936,494	.....	20,723	.....
October.....	829,215	971,447	.....	13,669	.....
November....	553,067	962,384	.....	13,442	.....
December....	406,730	1,019,841	.....	13,325	.....

Deducting from the total monthly production the output of the steel companies we reach the following series of figures, which represent closely the make of the merchant furnaces. Taking into account the fluctuations in the stocks, we arrive at the apparent consumption from month to month:

Statistics of Merchant Furnaces.—Gross Tons.

1904.	Production.	Stock. —Decline. +Increase.	Apparent consumption.
January	420,657	—21,615	442,272
February	452,151	—45,722	497,873
March	538,005	—71,364	609,369
April	587,081	—13,688	600,769
May	609,461	+101,433	508,028
June	506,917	+75,104	431,813
July	515,927	+49,960	465,967
August	425,175	—39,743	464,918
September	421,348	—73,883	495,231
October	483,823	—26,656	510,479
November	524,221	—70,198	594,419
December	596,400	—55,760	652,200
Totals.....	6,081,166	.....	6,273,338
1905.			
January	652,805	—26,594	679,399
February	569,406	—25,694	595,100
March	704,009	—31,489	735,498
April	699,331	+17,392	681,939

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Number of stacks.	May. Number in blast.	May. Capacity per week.	April. Number in blast.	April. Capacity per week.
New York:					
Buffalo district....10		10	19,979	10	18,400
Other New York....11		4	3,909	5	3,808
New Jersey..... 8		6	7,111	5	6,408
Spiegel 2		1	208	1	206
Pennsylvania:					
Lehigh Valley.....27		18	12,481	18	12,313
Spiegel 2		2	411	2	300
Schuylkill Valley...13		10	10,147	10	10,161
Low. Susquehanna.10		5	6,785	5	6,194
Lebanon Valley....11		10	6,363	7	5,250
Spiegel 1		0	0	1	527
Pittsburgh district.39		39	115,500	38	112,860
Spiegel 3		3	2,333	3	2,370
Shenango Valley...21		19	38,424	19	35,750
West Penn.....24		18	22,825	15	20,106
Maryland 5		3	6,451	3	6,378
Wheeling district.....13		11	24,066	11	22,521
Ohio:					
Mahoning Valley...16		15	32,565	16	34,800
Central and Northern and Michigan.18		17	32,775	16	29,566
Hocking Valley. . 2		0	0	0	0
Hanging Rock..... 0		9	7,324	9	6,896
Illinois 21		18	36,350	18	41,061
Spiegel 1		1	1,300	1	1,407
Minnesota 1		1	1,197	1	1,117
Wisconsin 5		5	5,660	5	5,600
Missouri 1		1	933	1	760
Colorado 4		3	6,810	3	5,503
Spiegel 1		0	0	0	0
The South:					
Virginia 23		11	8,328	12	9,815
Kentucky 8		2	1,254	3	1,495
Alabama 45		26	31,052	24	28,749
Tennessee 16		14	7,847	14	8,284
Georgia 1		1	943	1	959
North Carolina.... 1		0	0	0	0
Totals.....364		283	451,331	277	439,564

For a series of months the active anthracite and coke furnace capacity fluctuated as follows in gross tons

	Coke capacity per week.		Coke capacity per week.
May 1, 1905.....451,331		August 1.....353,681	
April 1.....439,564		July 1.....384,825	
March 1.....403,157		June 1.....388,178	
February 1.....405,792		May 1.....373,496	
January 1.....377,879		April 1.....386,215	
December 1, 1904.....357,846		March 1.....347,424	
November 1.....334,249		February 1.....335,339	
October 1.....319,240		January 1, 1903.....346,073	
September 1.....291,573		December 1, 1902.....336,617	
August 1.....246,092		November 1.....330,110	
July 1.....272,301		October 1.....337,837	
June 1.....336,197		September 1.....328,243	
May 1.....368,244		August 1.....328,745	
April 1.....337,257		July 1.....303,793	
March 1.....308,751		June 1.....337,492	
February 1.....273,692		May 1.....337,627	
January 1, 1904.....185,636		April 1.....331,140	
December 1, 1903.....244,156		March 1.....316,039	
November 1.....273,715		February 1.....325,440	
October 1.....353,142		January 1, 1902.....291,992	
September 1.....360,197		December 1, 1901.....317,358	

During May there were blown in Hudson in New Jersey, one of the furnaces of the Allentown Rolling Mill Company, one Edgar Thomson in Pittsburgh, the sixth Cambria, Dunbar and Emporium in western Pennsylvania, one Steelton, the Lebanon Valley Furnace, Zanesville in Ohio and one North Works Furnace of the Illi-

nois Steel Company. The new No. 6 Ensley Furnace of the Tennessee Company was started on the 28th ult. A third Bessemer Furnace was also started, and the Republic Company put in the third Pioneer. There were blown out, Standish in New York, one Hokendauqua in the Lehigh Valley, one Paxton on the Lower Susquehanna, Victoria in Virginia, one Ashland in Kentucky, one Calumet in the Chicago district and one Ohio in the Mahoning Valley. One North Birmingham Furnace of the Sloss Company was put out.

Stocks.

Believing that a classification of the merchant stocks by general geographical conditions would aid in a correct appreciation of the situation, we have arranged them in three groups: The Eastern, which includes New York, New Jersey and the Schuylkill, Lehigh, Lower Susquehanna and Lebanon valleys; the Central Western and Northwestern, which includes western Pennsylvania, the Shenango and Mahoning valleys, the Hanging Rock region, central and northern Ohio, and Michigan, Illinois, Wisconsin, Minnesota and Missouri, and the Southern, which includes Virginia, Kentucky, North Carolina, Georgia, Alabama and Tennessee. The stocks, of course, do not include the holdings of the steel companies:

Merchant Furnace Stocks.

	Jan. 1.	Feb. 1.	March 1.	April 1.	May 1.
East	84,967	85,054	79,996	68,912	70,740
Central and Northwest	174,729	156,455	135,861	116,967	115,791
South	143,338	134,931	134,889	133,378	150,118
Totals	403,034	376,440	350,746	319,257	336,649

New York Pig Iron Warrant Market.

NEW YORK, May 10, 1905.

The sales of pig iron warrant certificates on the New York Produce Exchange the past week aggregated 1600 tons, of which 100 tons foundry, May, were sold at $16.10, and 100 tons foundry, February, at $16.25. The other transactions were all for regular certificates and included 300 tons, May, $15.75; 200 tons, June, $15.80, and 200 tons, June, $15.85; 400 tons, July, from $15.75 to $15.90; 200 tons, February, at $16, and 100 tons, February, $16.05. The following prices were established on call Wednesday noon:

	Regular.		Foundry.	
	Bid.	Asked.	Bid.	Asked.
Cash	$15.70	$16.00	....	....
May	15.70	15.85	$16.00	$16.25
June	15.70	15.95	16.00	16.25
July	15.70	15.85	16.05	16.25
August	15.70	16.00	....	....
October	....	....	16.00	16.30
February	15.70	16.00	16.00	16.15

Reports in the daily press to the effect that the Carnegie Steel Company has drawn plans for the building of five more blast furnaces, 50 open hearth furnaces, plate, slabbing and finishing mills, at the Ohio Works, Youngstown, Ohio, are officially denied. Such a huge project has not even been considered and is wholly untrue. The only new construction that the Carnegie Steel Company will do this year is the finishing mill at the Clairton Works and the new blast furnace at Mingo Junction, Ohio, which is already under way. It is probable that the Greenville Mills, at Greenville, Pa., may have some new equipment added to increase the capacity, but otherwise no new construction will be started by the Carnegie Steel Company this year.

Press reports to the effect that the Pittsburgh Steamship Company, a subsidiary interest of the United States Steel Corporation, had placed another large order for ore boats with the American Shipbuilding Company of Cleveland is untrue. The Pittsburgh Steamship Company has not placed any new orders for ore boats with the American Shipbuilding Company since last October and the four vessels ordered at that time are just completed.

The district offices of the American Steel Foundries are to be removed from Alliance, Ohio, to Sharon, Pa., on June 1. It is said that the preferred stock of this company will be placed on a 6 per cent. basis in July and that the company is turning out 14,000 tons of castings a month, against 8000 tons a month at the first of the year.

NEWS OF THE WORKS.

Iron and Steel.

One of the North Works furnaces of the Illinois Steel Company was blown in on April 30.

The new No. 6 furnace at Ensley, Ala., was blown in during the last week of April.

The Morgan Construction Company, Worcester, Mass., has recently started up the first two continuous rolling mills to be operated in Germany. The first is a pure continuous hoop mill, at the Dinslaker Works of the Gewerkschaft Deutsche Kaiser, and the second is a half continuous merchant mill at the Rheinische Stahlwerke, Ruhrort.

The report that Wilkoff Brothers Company, Youngstown, Ohio, who are largely interested in the Cuyahoga Falls Rolling Mill, Cuyahoga Falls, Ohio, intend to move the plant from that place to Youngstown, is officially denied.

The Reading Iron Company, Reading, Pa., has blown out and is relining its Emaus Furnace.

It is denied that John I. Fraser has bought the plant of the Morgantown Tin Plate Company, at Morgantown, W. Va., for the United States Steel Corporation. The sale of the plant to Mr. Fraser has not yet been confirmed by the courts.

Spang, Chalfant & Co., Incorporated, with offices in the People's Bank Building, Pittsburgh, has decided to materially enlarge the Etna Iron & Tube Works, located at Etna, just outside of Pittsburgh. Five new buildings will be erected and two butt weld furnaces will be built for making pipe up to 3 inches. The main building will be 100 x 180 feet; threading shop, 90 x 240 feet; galvanizing plant, 100 x 110 feet; warehouse, 75 x 380 feet, and the skelp storage building, 50 x 200 feet. These buildings will be of steel construction with concrete foundations, excepting the galvanizing plant, which will be of wood and concrete. The latter will have a daily capacity of 100 tons. The contract for the buildings has been awarded to the Fort Pitt Bridge Company of Pittsburgh. The threading department will contain 40 threading machines, contract for which has already been let.

The Broomall Iron & Steel Company, Belington, W. Va., expects to have its new plant completed in the course of three or four months. High grade planished and blued sheets will be made. The works will be equipped with six hot mills, three cold mills, six sheet, six pair and six annealing furnaces and four hammers; also 24 heating furnaces in the planishing department. Natural gas will be used for fuel. The capacity of the works will be about 8000 tons of planished and blued and 6000 tons of common sheets. The officers of the company are G. C. Broomall, president and general manager; Thomas C. Perrine, vice-president; S. M. Nease, secretary and treasurer, and Hart Hatch, general superintendent.

The rolling mill of the Fort Worth Iron & Steel Mfg. Company, at Dolard, Texas, was first put in operation on April 25. A specialty will be made of merchant bar iron.

The Interstate Iron & Steel Company, successor to the Emlyn Iron Works, started its plant at East Chicago into operation Thursday, May 4. A new mill is being installed and in about a month it is hoped by the managers that the complete plant will be in operation. The offices of the company have just been removed from the fifth floor to a suite of rooms on the Dearborn street front on the seventeenth floor of the First National Bank Building.

General Machinery.

The New England Forge Company has organized to do a general forging business on Washington street, Worcester, Mass., in a new building erected on property of the William Allen Sons Company. The partners are Frank Joynes and B. P. Reynolds, recently employed by Wyman & Gordon, Worcester. The new shop is 30 x 60 feet and one story. It is planned to do a drop forging business later on, but for the present the company will make a specialty of all sorts of general forging, including heavy work.

The Edward H. Munkwitz Company has been incorporated at Milwaukee, Wis., with a capital of $50,000, by Edward H. Munkwitz, Arthur R. Munkwitz and Herman Fehr. The company is the incorporation of the business heretofore conducted by Edward H. Munkwitz in the manufacture and sale of tanners' machinery, the shops being located on Muskego avenue, in the southern part of the city.

The Mayo Machinery Company, Laconia, N. H., manufacturer of knitting machinery, has leased the Casino Square Building in that place and will occupy it as an addition to the shops. Several changes will be made in the building, including the erection of a tower and the installation of elevators. New machinery has been purchased.

On May 1 the machine business of M. J. Collins & Co., Medina, N. Y., was taken over by the Medina Stamping & Machine Company. With the additional equipment the company is better prepared than ever before to do general machine and repair work. In connection with the machine business it has an up to date automobile department and carries a line of automobile supplies in stock as well as a line of injectors and lubricators

for high pressure boilers. M. J. Collins will continue in charge of the machine shop.

Rutledge & Hoffman of Gastonia and Frank Warlick of Newton, N. C., have opened up a machine shop in the latter place for doing general repair work. Mr. Warlick is superintendent.

The Withington & Cooley Mfg. Company, Jackson, Mich., will require but very little new machinery to replace that lost in the fire which recently destroyed part of its plant. The plans for rebuilding have not yet been prepared.

J. R. Lewis, Weatherford, Texas, has purchased the Weatherford Foundry & Machine Shop, which he is putting in first-class working order.

The May and June stock list of the Scully Steel & Iron Company, Chicago, announces that that firm has taken up the sale of the Thor pneumatic tools manufactured by the Aurora Automatic Machine Company, Aurora, Ill. These tools seem to embody a number of novel features. The riveting hammers are described as having the barrel, handle and valve cylinder all drop-forged in one solid piece, and the chipping hammers are made with duplex valves, accomplishing a very short valve travel. The drills are described as fitted with Corliss valves, short direct ports and telescopic feed screw.

The Bauer Machine Company has been incorporated at Jeffersonville, Ind., with $15,000 capital stock, by George H. Holzbog, Chas. V. Bauer and Henry M. Flexner.

Power Plant Equipment.

The National Construction & Supply Company, St. Louis, Mo., which is installing an electric light and power plant at Danville, Ky., for the Danville Light, Power & Traction Company, has purchased for installation in the plant two 14 x 16 Ideal engines, direct connected to two 10-kw. generators furnished by the General Electric Company; two 220 horse-power Heine safety water tube boilers, one 425 horse-power Cochrane heater and one Knowles duplex pump.

Recent orders secured by the Allis-Chalmers Company, Milwaukee, Wis., are as follows: United States Coal & Coke Company, Pittsburgh, Pa., one heavy duty cross compound noncondensing Reynolds-Corliss engine, direct connected to a 750-kw. alternating current generator; Shenango Furnace Company, at Sharpsville, Pa., a vertical "Standard" type furnace blow engine, with cylinders 44 and 84 inches in diameter and a 60-inch stroke; Branch Mint Gold Mining Company, a No. 6 Gates rock breaker for the 120-stamp mill being erected at Galena, S. D.; Hamilton Gas & Electric Company, Cincinnati, two 250-kw. Bullock engine type alternators, two 15-kw. Type B exciters, and one 150 horse-power induction motor, direct coupled to a 100-kw. direct current generator; the Cincinnati, Milford & Loveland Traction Company, five complete car equipments, each consisting of four 50 horse-power Bullock motors, for double end control street cars, together with other auxiliary apparatus; the H. C. Frick Coke Company, electrical apparatus to be installed at its Yorkrun mine, Connellsville, Pa., including three 400-kw. Bullock alternating current generators for direct connection to engines; Tuolumne Electric Company, San Jose, Cal., one 600-kw. alternating current generator; the Cleveland Electric Railway Company, Cleveland, Ohio, one heavy duty cross compound Reynolds-Corliss condensing engine, having cylinders 32 and 68 inches in diameter and a 60-inch stroke—this will be direct connected to a 1500-kw. street railway generator; San Joaquin Power Company, Fresno, Cal., two 1000-kw. Bullock water wheel type alternating current generators, seven 350-kw. and four 500-kw. transformers, with exciters and other apparatus; the transformers will be of the Bullock type, oil filled and water cooled.

The Sussex Smelting Company of Jersey City, N. J., which recently moved its plant from Sussex street to the outskirts of the city, is in the market for machinery for a power plant to be constructed in connection with its new works. The plant is to be a small one, and the purchasing is being done by Albert Goldman, who can be addressed at Jersey City.

The Sullivan Waterworks Company, Sullivan, Ind., has been incorporated with $75,000 capital stock, to construct and operate a water works system in that city. Plans are now being made. The directors are C. J. Sherman, A. D. Scott and J. K. Smock.

The Connersville Light, Heat & Power Company, Connersville, Ind., has been incorporated with $100,000 capital stock and will erect a plant. R. N. Burgess is president; W. E. Lowe, secretary.

Thomas Yater, Shelbyville, Ind., Auditor of Shelby County, will receive bids to May 18 for a light, heat and water plant for the Court House.

Foundries.

The Fagan Iron Works, Hoboken, N. J., will rebuild its plant at Jersey City, which was recently destroyed by fire, and hopes to have it running in about one month. No new machinery will be required, as the company has plenty on hand.

The Mobile Foundry Company, Mobile, Ala., has incorporated with $10,000 capital stock.

Ten acres of ground at New Albany, Ind., north of the Baltimore & Ohio Railroad, have been purchased by Gohmann Brothers & Kahler, manufacturers of stoves, ranges, castings and hollow ware, upon which they intend to erect a new plant, which is expected to be ready for occupancy before the end of the year. The New Albany Table Company is interested in the deal and will occupy a portion of the ground.

W. D. Hoffius & Co., Seattle, Wash., have under consideration the erection of a plant for the manufacture of steel and iron pipe.

Loeffelholz & Co., Milwaukee, Wis., brass founders and machinists, are erecting an addition, 30 x 80 feet, to their brass foundry. To secure ample light and air bay windows are being erected on the edge of the foundry roof in the place of skylights, the bays running up to the cupola windows. Power from the main plant will be utilized in the addition.

The Chicago Brass Company, Kenosha, Wis., is contemplating some improvement to its plant.

The South Framingham, Mass., Foundry, which has been idle for some time, has passed into the hands of Thomas E. Raymond and Timothy J. Cahill, doing business as Raymond & Cahill, who have leased the property of the South Framingham Industrial Association for a term of five years.

The Richmond Foundry & Mfg. Company, Richmond, Va., is installing additional tools with the view particularly of enabling it to manufacture specialties in addition to its regular line of machine and foundry work.

The American Steel Foundries, New York, has received an order from the Baldwin Locomotive Works for about 3750 tons of steel castings to be used in the construction of 250 locomotives. The company is also in receipt of orders for 3000 Janney couplers, to be applied to 1500 cars to be built by the Pressed Steel Car Company for the Chesapeake & Ohio Railroad, and 6000 couplers for application to 3000 Lehigh Valley cars.

Bridges and Buildings.

John Geist, Milwaukee, Wis., has been engaged to draw up plans and specifications for a bascule bridge to be built at Racine, Wis., to cost about $80,000.

The National Bridge Company, Indianapolis, Ind., secured the contract from the commissioners of Miami County, Ind., for concrete bridge over the Wabash River at Peru, Ind., for $37,390.

Fires.

The factory of the Brennan Boot & Shoe Company, Natick, Mass., was burned May 6, with a loss of $30,000.

The factory occupied by Joseph F. Klein and Jeremiah J. Riordan, carriage manufacturers, Amesbury, Mass., was burned May 3, with a loss of $7000.

The Ashuelot Paper Company's plant, Hinsdale, N. H., was damaged by fire to the extent of $25,000 last week.

The machine shop of the Burnes & Russell Company, at Dundalk, near Baltimore, Md., was destroyed by fire April 28.

The Illinois Malleable Iron Company, Chicago, as a result of fire at its general offices, at 30-32 W. Monroe street, has opened temporary offices at 34-36 W. Monroe street. The company states that its ability to make shipments is not interfered with, as a large stock is carried at its factory and also at the three branch stores in Chicago, from which points distribution will be made. It has not yet been decided whether the firm will reoccupy its old building when rebuilt. The fire loss, about $40,000, was covered by insurance.

Hardware.

The Kline Hardware Company, Allentown, Pa., incorporated under the laws of Pennsylvania with a capital stock of $50,000 paid in, has taken over the business formerly conducted by the Novelty Iron Works. The change in name was made necessary on account of the previous incorporation of another concern under the Novelty name. The company will continue the manufacture of hardware specialties without change in the management of the business.

The Salem Machine Knife Company, Salem, Mass., has taken the Holman factory in that city and will make a specialty of all kinds of knives and blades for leather work, especially whitening and shaving blades. The firm has a new process of tempering steel, it is stated. The members of the firm are J. J. Duquette, Peter St. Pierre and David St. Pierre, all of Salem.

The Fernside Screen Works, Hartford, Conn., has been incorporated in Connecticut to manufacture window screens, screen doors, bird cages, fire screens, &c. The incorporators are George W. Fernside, Clapp & Treat, hardware merchants, and Herman C. Marquardt. A factory has been established.

The Pearl Laundry Marking Company, Atlanta, Ga., is manufacturing laundry marking machines under the patents of Tom L. Taylor, who is president of the corporation. By means of these a laundryman is enabled at once to duplicate the mark of each piece of laundry in any parcel a customer may give him to wash.

E. C. Atkins & Co., Indianapolis, Ind., are just completing three large saws, the combined cost of which will be about $10,000. Each is 8 feet in diameter and 5-16 inch thick. Each has 200 Brazilian diamond teeth, each diamond about one carat. The saws will be used in cutting limestone in Indiana quarries.

Miscellaneous.

The Blair Light Company, Northboro, Mass., has been organized to take over the business of the Automatic Incandescent

Light Company, Philadelphia, the factory of which is in Northboro. The new corporation means a reorganization with the purpose of increasing the manufacturing facilities. The president and treasurer is Thomas H. Blair, Northboro; clerk, J. L. Coffin, Northboro, and directors, these officers and Henry F. Harris, Worcester, Mass. The company manufactures a street lamp which secures its draft in effecting incandescence by an automatic arrangement instead of the usual spring attachment.

A new company is organizing at Athol, Mass., to manufacture postal stamp registers, with $3000 capital stock. The president is Charles A. Chapman, cashier of the Athol National Bank, and the secretary and treasurer is George R. Paige. A few of the registers are being manufactured by outside parties, and if they prove to be a success it is probable that a shop for their manufacture will be established later.

The T. A. Gillespie Company, Pittsburgh, has awarded to the Ludlow Valve Mfg. Company, Troy, N. Y., through its Pittsburgh office, a contract for the stop valves, fire hydrants, standards and air valves, for use in connection with the new filtration plant to be built by the city of Pittsburgh. There will be used in this work between 3000 and 4000 Ludlow valves, in sizes from 3 to 72 inches, inclusive.

The Farmers' Mfg. Company, Sebring, Ohio, contemplates increasing the capacity of its plant.

E. L. Sibley, Bennington, Vt., has purchased from the S. L. Godfrey Estate all its ocher properties and is installing up to date machinery wherever possible to improve the processes of mining and manufacture. The quality of the ocher is said to be the best in America, strong, bright and clean, being free from manganese and other impurities.

The Miller-Collins Company, St. James Building, New York, which has the contract for the $175,000 factory building for Hanan & Son, in Brooklyn, N. Y., is in the market for a large amount of building material. The new building will be five stories high, 100 x 200 feet, and will be of reinforced steel concrete construction.

At a meeting of the Board of Directors of the Vulcan Detinning Company, New York, the retiring officers were re-elected with the exception that Adolph Kern was elected vice-president in place of Lyman G. Bloomingdale.

The York Metal & Alloy Company, York, Pa., capitalized at $20,000, has taken over the Morton Machine Works, which it will occupy for the manufacture of an alloy used in the making of high grade crucible steel.

The Dorner Mfg. Company, Logansport, Ind., is the successor of the Dorner Truck & Mfg. Company, the plant of which was closed about a year ago for lack of sufficient capital. It will be reopened under ample financial backing. Henry A. Adams, Cleveland, Ohio, is president, and H. A. Dormer, Chicago, secretary.

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., has been awarded an order by the Lackawanna Steel Company, Buffalo, N. Y., for a complete White Star continuous oiling system to be used in connection with 32,000 horse-power of engines in the Lackawanna Company's plant at Buffalo.

The Bowers Mfg. Company, Lima, Ohio, has merged with the Indianapolis Steel Roofing & Corrugating Company, and its plant will be moved to that city. The Indiana Company has increased its capital stock from $15,000 to $75,000 and will occupy greatly enlarged quarters. S. D. Noel, president; J. Q. A. McClurg, secretary-treasurer.

The Center Point Brick Works, Center Point, Ind., will build a plant. L. C. Kennedy, C. W. Mace and H. L. Lancett are directors.

The Stuart Railroad Block & Signal Company has been incorporated at Indianapolis, Ind., with $100,000 capital stock. The directors are Robert F. Stuart, Geo. E. Ross, Victor E. Seeter, Michael F. Mahoney and Edward C. Folsom.

Building permits in the 20 largest American cities for the month of April aggregate 9160 structures at a cost of $40,993,888, as against 8577 buildings costing $32,443,068 in April, 1904. This is a gain of 27 per cent. The gain for the city of New York is 34 per cent.; Chicago, 70 per cent.; Pittsburgh, 39 per cent.; Minneapolis, 79 per cent.; Detroit, 55 per cent.; Cincinnati, 46 per cent.; Kansas City, 22 per cent.; Columbus, 61 per cent.; St. Paul, 46 per cent.; Denver, 54 per cent.; Indianapolis, 43 per cent.; Louisville, 105 per cent.; Memphis, 62 per cent.; while losses are shown in Brooklyn, Philadelphia, Milwaukee, Buffalo and Allegheny.

John Platt of this city has been appointed representative of the Parsons Turbine Works and sails for England from Montreal on Friday on the Victorian, one of the new turbine steamers.

Trade Publications.

Roller Bearings.—Hyatt Roller Bearing Company, Harrison, N. J. Bulletin No. 118. Contains a report upon a comparative test of the friction of Hyatt roller bearings and cast iron, bronze and babbit bearings under various loads and at different speeds. The test was made by Arthur L. Williston, in charge of the Department of Science and Technology of the Pratt Institute, Brooklyn, N. Y. The conclusions from the tests make it evident that the friction of a cast iron bearing is over five times as great as that of a roller bearing, and the friction of a bronze bearing nearly nine and a half times greater.

Electrical Apparatus.—American Electric & Controller Company, 136 Liberty street, New York City. The following series of bulletins: No. 1, Description of a Rheocrat (illustrated in *The Iron Age*, December 8, 1904); No. 2, applications of the Rheocrat; No. 3, electrically operated switches; No. 4, automatic starters for induction motors; Nos. 5 and 6, applications of automatic starters; No. 7, solenoids for direct and alternating current service; No. 8, applications of solenoids. A binder is furnished in which to preserve these bulletins.

Steam Turbines.—General Electric Company, Schenectady, N. Y. Publication No. 9137. Size 8 x 10½ inches. Pages 26. Devoted to the Curtis steam turbine, giving illustrations of a number of representative installations of this turbine. The first machine was put into service in the power house of the company at Schenectady, October 1, 1902, and there are now in daily operation Curtis turbines of an aggregate capacity of over 100,000 kw. Among the notable installations shown are three of 5000 kw. capacity each in the Chicago Edison Company, and three of the same size in the New York Edison Company. The equipment at the St. Louis World's Fair, consisting of a 2000-kw. set, is also illustrated. Circular No. 3294 gives a partial list of Curtis turbines installed or under construction.

Electrical Machinery.—General Electric Company, Schenectady, N. Y. Publication No. 9136; size 8 x 10½ inches; pages, 30. Bulletin No. 4403. Publication No. 1048; size 5¼ x 7¾ inches; pages 48. The first catalogue is confined to the subject of motor generator sets. These are made in a wide range of sizes and types, adapted to various purposes. A number of equipments, remarkable for some particular feature, are illustrated. Tables are given of the sizes of the various types. The bulletin deals with a separate adjustable shunt field coil for Thompson recording watt meters. Publication No. 1048 concerns General Electric fan motors, showing all the various patterns in which they are made, giving prices of complete fans with their specifications. The fans include the common desk, wall, ceiling and column types, as well as a few disk and ventilating fans.

Wire Rope Haulage.—Jeffrey Mfg. Company, Columbus, Ohio. Folder. Deals with the Jeffrey wire rope system of car haulage, giving photographic views and a diagrammatic profile of an equipment installed at the Beckley Coal & Coke Company's plant, where the distance between terminals is 350 feet, and views and drawings of details of a car haul at the Midway Coal Company, which is 325 feet between centers.

Boring Mills.—Colburn Machine Tool Company, Franklin, Pa. Bulletin No. 20. Pertains particularly to a 53-inch boring and turning mill, referred to as one of the best sizes, and especially adapted to a large range of railroad and machine shop work. This mill was described in *The Iron Age*, December 8, 1904. Also mentions briefly the characteristics of Colburn mills in general, upon which the company bases its strongest claims.

Rivet Forges.—Ingersoll-Sergeant Drill Company, 26 Cortlandt street, New York City. Bulletin No. 2000. Describes the MacDonald rivet forge (illustrated in *The Iron Age*, April 28, 1904), in which the fan supplying the blast is driven by a jet of air under pressure, impinging on the blades. This bulletin is the first of a series to be issued on labor saving tools operated by compressed air. They will all have the same distinctive buff color and typographical make up.

Dump Cars.—Continental Car & Equipment Company, 17 Battery place, New York City. Catalogue; size 6 x 9 inches; pages 23. Devoted to different forms of dumping cars, suitable for railways and contractors or for use in sand pits, brick yards, phosphate plants or any work requiring the removal of large quantities of earth, rock, sand, gravel, &c. The dump cars illustrated are classified as rotary, one-way, two-way, end dump and gravity cars, all of which are made in a variety of sizes.

Conveying Machinery.—Jeffrey Mfg. Company, Columbus, Ohio. Bulletin A. Contains an illustrated description of a novel coal and ashes distributing plant installed for the Scioto Valley Traction Company at Reese's Station, Ohio.

Lubricators.—Comstock Engine Company, 49 Clymer street, Brooklyn, N. Y. Pamphlet. Gives a descriptive price-list of the Graphoil lubricator, a new product of this company, which uses oil and graphite in combination.

Electric Fans.—Sprague Electric Company, 527 West Thirty-fourth street, New York. Bulletin No. 309. Describes 12 and 16 inch swivel and trunnion and solid pedestal, desk and bracket types, ceiling fan motors and exhaust fans, giving illustrations, specifications and price-lists.

The Iron and Metal Trades

The returns of the producers of Anthracite and Coke Pig Iron to *The Iron Age* show that during April, a short month, the output was 1,922,041 gross tons, an increase over March, when the product was 1,936,264 tons in 31 days. An additional day in April would have carried the make to 1,986,000 tons. May promises to have an even higher record, since we entered the month with furnaces producing at the rate of 451,331 tons per week, as compared with 439,564 tons on April 1. This would indicate a May product of very close to 2,000,000 tons, exclusive of charcoal iron.

A study of the situation at the works proves that this is sure to be the maximum for some time to come, since few new furnaces are due in the next few months and since many producers are running at a rate which they cannot hope to maintain. Thus, the United States Steel Corporation is operating 98 per cent. of its theoretical capacity.

The most significant feature of our furnace report is, however, the fact that for the first time since August last the stocks in the hands of merchant furnaces show an increase. The increase is small, being 17,000 tons, but it will be widely interpreted as an indication that the tide has turned.

The decision of the Steel Corporation not to buy any Iron in the open market in May, the softening in prices in the South, to which district the accumulation of Iron has been practically confined thus far, and the disappointment over the fact that the general foundry trade has not developed as expected some months since are all factors in the situation.

It is interesting to note, as bearing on the attitude of Pig Iron makers, that a project is under consideration at Pittsburgh having for its object the control of the Bessemer and Basic Pig Iron output of the merchant furnaces in the Mahoning and Shenango valleys. The scheme involves a central selling agency, an executive committee making all the sales of the Bessemer and Basic grades. It is the aim to keep this Iron out of the hands of brokers as much as possible. As yet the plan is in its initial stages only.

Southern makers of Pig Iron openly acknowledge that the market has declined to the $13.25 basis, Birmingham, and there is evidence that $13 has been done.

In the Central West the Cambria has purchased 40,000 tons of Bessemer Pig and has taken one lot of 4000 tons of Low Phosphorus Pig. Other large transactions are pending.

Eastern Cast Iron Pipe makers have taken about 12,000 tons, and there have been some further round sales of Basic Pig.

A moderate tonnage of Structural Material has been placed during the week, but there is some very big work ahead. Bids go in this week for a lot of about 21,000 tons here in New York. In Philadelphia a lot of 20,000 tons is on the eve of being closed, and in the distance looms up the 55,000 tons for the new Manhattan Bridge.

The tone in the lighter lines is weaker, this including Wire, Sheets, Tin Plate and Tubes. Whether plans now being considered to brace the markets will be effective remains to be seen.

Quite a considerable tonnage of Sheet and Tin Plate Bars has been sold lately for delivery abroad during the third quarter.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	May10, 1905.	May 3, 1905.	Apr.12, 1905.	May 11, 1904.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	$17.50	$17.75	$17.50	$15.00
Foundry Pig No. 2, Southern, Cincinnati	*15.75*	16.00	16.25	12.50
Foundry Pig No. 2, Local, Chicago	17.25	17.25	17.25	13.75
Bessemer Pig, Pittsburgh	*16.10*	16.35	16.35	13.60
Gray Forge, Pittsburgh	*15.50*	15.60	16.00	12.75
Lake Superior Charcoal, Chicago	*17.50*	18.50	18.50	15.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	24.00	24.00	24.00	23.00
Steel Forging Billets, Pittsburgh	27.00	27.00	27.00	....
Steel Billets, Philadelphia	28.00	28.00	28.00	24.25
Steel Billets, Chicago	28.00	28.00	28.00	24.00
Wire Rods, Pittsburgh	34.00	34.00	34.00	30.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	*13.00*	13.75	15.25	11.00
O. Steel Rails, Philadelphia	*16.75*	16.75	18.00	12.50
O. Iron Rails, Chicago	*18.50*	19.00	20.00	16.50
O. Iron Rails, Philadelphia	*22.50*	22.50	25.00	17.00
O Car Wheels, Chicago	*15.00*	14.50	16.00	13.00
O. Car Wheels, Philadelphia	*16.00*	16.00	17.00	12.00
Heavy Steel Scrap, Pittsburgh	*15.00*	16.00	16.25	12.00
Heavy Steel Scrap, Chicago	*12.50*	13.25	14.75	10.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.73½	1.73½	1.73½	1.48½
Common Iron Bars, Chicago	*1.55*	1.55	1.60	1.45
Common Iron Bars, Pittsburgh	*1.55*	1.60	1.65	1.35
Steel Bars, Tidewater	1.64½	1.64½	1.64½	1.49½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.35
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.74½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.74½
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Steel, Pittsburgh	*1.55*	1.60	1.65	1.35
Skelp, Sheared Steel, Pittsburgh	*1.60*	1.65	1.70	1.35
Sheets, No. 27, Pittsburgh	2.30	2.30	2.30	2.10
Barb Wire, Pittsburgh	2.25	2.25	2.25	2.50
Wire Nails, Pittsburgh	1.80	1.80	1.80	1.90
Cut Nails, Pittsburgh	1.80	1.80	1.80	1.75
METALS:				
Copper, New York	*15.00*	15.00	15.25	13.37½
Spelter, St. Louis	*5.45*	5.62½	5.80	5.00
Lead, New York	4.50	4.50	4.50	4.50
Lead, St. Louis	4.47½	4.50	4.47½	4.35
Tin, New York	*29.90*	30.00	30.95	27.60
Antimony, Hallett, New York	**8.75**	8.50	8.25	7.25
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.74	3.74	3.74	3.64

Chicago.

FISHER BUILDING, May 10, 1905.—(*By Telegraph.*)

The general attitude of buyers not only of Pig Iron but of all finished products is one of waiting to see what will turn up next. If it should happen that the report that will be published in this week's *Iron Age* shows that the record breaking production of March continued through April, and that stocks on hand still further decreased, it is thought by many that this will be a signal to rush to cover by buyers of Pig Iron. And, on the other hand, if it is shown that stocks have increased, the attitude of waiting may be continued for some weeks further. Buyers, as a general proposition, are crouching ready to spring for a race in case a race seems necessary, and yet are not disposed to move before some strong force sets the pace. A reduction in the price of Pig Iron by any large interest would doubtless check buying for some time, while the slightest showing of increased strength would lead to a general rush to cover on the part of buyers. An immense tonnage of Pig Iron is still unpurchased for the second half of the year. This is true also of Finished Iron and Steel of every description, although in Bars and Agricultural Shapes a very large tonnage was placed for future delivery just previous to the last advances. The two strongest items in Iron and Steel are Structural Shapes and Plates, with Bars running not far behind. As a general proposition, especially since the Baltimore & Ohio placed its order for 10,000 cars and 350 locomotives, anything that enters into the construction of cars and locomotives is strong. Sheets and Pipe are the weakest members of the finished class and cut prices are widely quoted. Lake Superior Charcoal Iron has suffered a break in price, owing to very heavy stocks. Old Materials are weak and still rapidly declining in price.

Pig Iron.—An order for 5000 tons of Malleable Iron for delivery up to the third quarter was placed by a large Malleable foundry with Northern furnaces. Outside of this business has been at almost a standstill, and the buying trade in general seems disposed to wait several weeks before covering for the second half of the year. A large percentage of Iron required for the first half is already in melters' yards or covered by contracts, and possibly 25 per cent. of Iron required for the second half is also covered; but it is only a matter of a few weeks, or possibly even days, until the buying movement for the second half sets in. Whether this move starts soon or is delayed depends upon the strength shown by the market itself. In Southern Iron one hears at every hand of quotations on the $13.25, Birmingham, basis, but no furnace agent is willing to admit that he is a guilty party. The supposition is that whatever cutting is being done is on the part of makers of high phosphorus Iron who are accustomed to quoting about 25c. below the standard grades. The largest interests concerned in the manufacture of Lake Superior Charcoal Pig Iron, with whom Pig Iron is a by-product and wood alcohol the real product, are beginning to force the sale of accumulated stocks of Charcoal Iron by quoting $16 to $16.50 at the furnace, or $17.50 to $18, Chicago, as the going price, against $18.50 to $19 last week, a clear drop of $1. Quotations are as follows:

Lake Superior Charcoal	$17.50 to $18.00
Northern Coke Foundry, No. 1	17.75 to 18.00
Northern Coke Foundry, No. 2	17.25 to 17.50
Northern Coke Foundry, No. 3	16.75 to 17.00
Northern Scotch, No. 1	18.00
Ohio Strong Softeners, No. 1	18.80 to 19.30
Ohio Strong Softeners, No. 2	18.30 to 18.80
Southern Silvery, 4 to 6 per cent. Silicon	18.65 to 19.65
Southern Coke, No. 1	17.65 to 17.90
Southern Coke, No. 2	17.15 to 17.40
Southern Coke, No. 3	16.65 to 16.90
Southern Coke, No. 4	16.40 to 16.65
Southern Coke, No. 1 Soft	17.65 to 17.90
Southern Coke, No. 2 Soft	17.15 to 17.40
Southern Gray Forge	16.60 to 16.75
Southern Mottled and White	15.90 to 16.15
Malleable Bessemer	17.50
Standard Bessemer	18.30 to 18.80
Jackson Co. and Ky. Silvery, 6 % Silicon	19.80
Jackson Co. and Ky. Silvery, 7 % Silicon	21.30
Jackson Co. and Ky. Silvery, 8 % Silicon	22.30
Jackson Co. and Ky. Silvery, 10 % Silicon	23.30
Alabama Basic	17.65
Virginia Basic	17.65

Billets.—The prospective buyer of about 3000 tons of Sheet Bars decided not to purchase on the present market, as the best figures obtainable were $29.50, Chicago, a price that was deemed too high in proportion to the prices now received for Black Sheets. Open Hearth Forging Billets in ordinary lots sold at from $30 to $32, and one lot of 700 tons was sold at $30. Bessemer Rolling Billets would be quoted at $28 to $30. Billets are scarce and deliveries greatly delayed.

Rails and Track Supplies.—As far as can be learned no orders of any magnitude were placed through Chicago offices for Eastern mills, and, of course, no orders were taken for the Western mill, because its books are closed. Demand for Light Rails is reported to be excellent. We repeat last week's quotations as follows: Standard Section Rails $28 per gross ton at maker's mill in 500-ton lots or greater, plus full freight to destination; Light Section Rails, $24 to $27 per gross ton, according to weight and tonnage; Angle Bars, 1.40c. to 1.50c.; Spikes, 1.75c. to 1.85c., f.o.b. Joliet, in car lots; Track Bolts, 2.40c. to 2.50c., base, with Square Nuts, and 10c. to 15c. higher for Hexagon Nuts. Store prices on Track Supplies range from 15c. to 25c. per 100 lbs. above car lot mill prices.

Structural Materials.—The recent order for 10,000 cars placed by the Baltimore & Ohio Railroad in addition to the great activity on the part of railroads in building bridges and the general improvement in building operations all conspire to strengthen the already strong market on Structural Steel,and the shortage on small sizes such as are used in cars is growing worse instead of better. No large orders for Structural Steel for buildings have been placed within the week, but there are several important building prospositions that will come up before long. Official prices for delivery from mill, f.o.b. Chicago, in car lots, are as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.76½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.76½c.; Angles, larger than 6 inches on one or both legs, 1.86½c.; Beams, larger than 15 inches, 1.86½c.; Zees, 3 inches and over, 1.76½c.; Tees, 3 inches and over, 1.81½c., in addition to the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices for either random lengths or cut to lengths on Angles, Beams and Channels, base sizes, range from 2.10c. to 2.25c., with the usual extras for size.

Plates.—There seems to be less disposition on the part of mills to demand premiums for prompt delivery, and at least one large eastern Pennsylvania mill is freely offering business at the official prices and shipping in from a week to ten days from receipt of order. This should not be taken as a sign of serious weakness, and, indeed, weakness is not looked for, particularly on lighter gauges, because of the very heavy orders placed for cars by the Baltimore & Ohio and other roads. Official prices are unchanged as follows: Tank quality, ¼-inch and heavier, wider than 14 and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16-inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Sheared and Universal Mill Plates, Tank quality, 6¼ to 14 inches, inclusive, 10c. below these prices; Flange quality in widths up to 100 inches, 1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank plate, ¼-inch and heavier up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16-inch upon to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8 up to 60 inches wide, 2.15c. to 2.25c.; Flange quality, 25c. extra.

Sheets.—As far as can be learned, no buyers of Sheets in car lots whose credit is good have yet paid as high as the official market price for Sheets, the present official prices serving only to support the market and to prevent much lower prices than now prevail. So large a tonnage was booked by the leading producer and contracts were made by that interest covering such a wide field of operations that the only new business developing for either the leading producer or for independents is of a desultory pick up character, the ruling prices being from 5c. to 10c. lower than the official figures, according to the size and desirability of the order, on Black Sheets, and very close to the official price on Galvanized. Official quotations for car lots in base sizes are as follows: Blue Annealed Sheets, Nos. 9 and 10, 1.91½c.; Box Annealed Sheets, Nos. 18 and 20, 2.31½c.; do., No. 27, 2.47½c.; do. No. 28, 2.56½c., with the customary differentials between gauges. Store prices are based on a minimum of 2.10c. for No. 10 Blue Annealed, 2.55c. for Nos. 18 and 20 Box Annealed, 2.70c. for No. 27 Box Annealed and 2.80c. for No. 28 Box Annealed. Galvanized Sheets are officially quoted at the following minimum prices at Chicago, in car lots from mill, base sizes: No. 10, 2.51½c.; Nos. 18 and 20, 2.86½c.; No. 27, 3.41½c.; No. 28, 3.61½c. Some mills ask 5c. and 10c. higher. Minimum store prices on Galvanized, base widths, are: Nos. 10, 12 and 14, 3.10c.; Nos. 22 and 24, 3.25c.; No. 27, 3.70c.; No. 28, 3.95c., with the usual differentials between gauges and extras for widths and lengths.

Bars.—Scrap Iron has suffered still further radical reductions in price and Bar Iron, in sympathy with it, is weak at 1.55c. to 1.60c., though the large car orders from the Baltimore & Ohio and other interests received by Western car works are tending to strengthen the Bar Iron market. It is pretty generally felt that when Bar Iron shall be quoted at 1.50c. a pronounced demand for it will develop and Bar mills will again be busy. The remodeled plant of the Interstate Iron & Steel Company was started up last week and from now on will be a factor in both Shapes. Steel Bars are unchanged officially at 1.50c., base, Pittsburgh, or 1.66½c., base, Chicago, in car lots, with the usual penalties for less than 1 ton and less than 1000 lbs. of a size. The looked for advance in Hoops has not yet been announced, the price remaining at 1.81½c., base, half extras, Chicago. Soft Steel Angles and Shapes are held at 1.76½c., half extras, in car lots, and Hard Steel Angles and Bars rule about 10c. per 100 lbs. below the price of Soft Steel. In store prices Steel Bars and Bands are being held at a minimum of 1.85c., base, half extras; Steel Angles and Shapes, 1.95c., half extras, and Soft Steel Hoops, 2.20c., full extras, with 5c. to 10c. higher than the minimum prices named for small quantities from store.

Merchant Steel.—Mills making Merchant Steel, particularly Agricultural Shapes, are so well filled with business that they are not disposed to force the issue and are satisfied to wait until buyers express their willingness to contract for the last half of this year or further. Already some small contracts have been closed at current prices. Prices are firm, as follows: Smooth Finished Machinery Steel, 1.91½c.; Smooth Finished Tire, 1.86½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.86½c.; Cutter Shoe, 2.40c.; Toe Calk Steel, 2.23½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting, 50 per cent. discount in car lots and 45 per cent. in less than car lots in base territory.

Merchant Pipe.—While the leading producer reports a record breaking business, independent mills are shading off the prices one or two points on such sizes as they can furnish. The only weak spot in the Pipe market is on sizes ordinarily used for Oil Pipe lines. The vast tonnage ordinarily consumed by the oil interests has not developed, owing to the state of warfare in Kansas and the unsatisfactory condition of the oil market in other fields. On the other hand, operations in gas lines are rather heavier than usual; they tend to supply the deficiency. Official discounts on base sizes, ⅜ to 6 inches, f.o.b. Chicago, in car lots, are as follows: Black Steel, 73.35; Galvanized Steel, 63.35; Black Iron, 71.85; Galvanized Iron, 61.85, with the customary differentials for larger and smaller diameters and for X and XX strong.

Boiler Tubes.—The market for Boiler Tubes is ac-

tive, and mills seem to be fully employed, some of them being very far behind their orders. The following discounts on car lots, from mill at Chicago, prevail: Base sizes, ¾ to 5 inches, Steel Tubes, 60.35; Iron, 49.35; Seamless Steel, 52.85. Larger and smaller diameters take the usual extras in price and less than car lots are quoted at two points less discount. We quote from store:

	Steel.	Iron.	Seamless.
1 to 1½ inches	40	35	42½
1¾ to 2¼ inches	50	35	35
2½ inches	52½	35	30
2¾ to 5 inches	60	47½	42½
6 inches and larger	50	35	..

Cast Iron Pipe.—The city of St. Louis placed an order with the leading producer for 3900 tons. The New Orleans tonnage, on which the same interest is the lowest bidder, amounts to 13,000 tons. Lincoln, Neb., placed with the same interest an order for 1000 tons, and a good business is being done in smaller lots. Pipe mills are reported to be fully occupied and prices are unchanged but strong for ordinary lots at $29 a gross ton for 4-inch Pipe and $28 for 6-inch and larger, with $1 a ton higher for Gas Pipe.

Old Material.—The rapid downward movement of the market continues, with no immediate relief in sight, and is characterized by small trading of a hand to mouth character, such as usually characterizes a falling market. In the face of a general decline Old Car Wheels have advanced because of the unusual demand for new Wheels. The dearth of trading makes it difficult to determine actual market prices, but as nearly as they can be arrived at the following are about the figures at which large consumers would purchase from railroads or dealers in large lots:

Old Iron Rails	$18.50 to $19.00
Old Steel Rails, 4 feet and over	14.00 to 14.50
Old Steel Rails, less than 4 feet	13.00 to 13.50
Heavy Relaying Rails, subject to inspection	22.25 to 22.75
Heavy Relaying Rails, for side tracks	19.50 to 20.00
Old Car Wheels	15.00 to 15.50
Heavy Melting Steel Scrap	12.50 to 13.00
Frogs, Switches and Guards	12.50 to 13.00
Mixed Steel	10.00 to 10.50

The following quotations are per net ton:

Iron Fish Plates	$15.50 to $16.00
Iron Car Axles	20.00 to 20.50
Steel Car Axles	16.00 to 16.50
No. 1 Railroad Wrought	14.00 to 14.50
No. 2 Railroad Wrought	13.00 to 13.50
Shafting	15.00 to 15.50
No. 1 Dealers' Forge	11.00 to 11.50
Wrought Pipes and Flues	9.50 to 10.00
No. 1 Cut Busheling	9.00 to 9.50
Iron Axle Turnings	9.50 to 10.00
Soft Steel Axle Turnings	9.50 to 9.75
Machine Shop Turnings	9.00 to 9.25
Cast Borings	7.00 to 7.50
Mixed Borings, &c	7.00 to 7.50
No. 1 Mill	8.50 to 9.00
Country Sheet	7.00 to 7.50
No. 1 Boilers, cut to Sheets and Rings	9.25 to 9.50
No. 1 Cast Scrap	12.50 to 13.00
Stove Plate and Light Cast Scrap	9.00 to 9.50
Railroad Malleable	12.50 to 13.00
Agricultural Malleable	11.50 to 12.00

Metals.—The market is unchanged with the exception of Spelter, which is still very weak and ½c. lower in price. We quote as follows: Copper is held at 14⅞c. to 15c. for Casting and 15⅛c. to 15¼c. for Lake, in car lots, with ¼c. to ½c. higher for small lots. Lead is quoted in 50-ton lots at 4.55c., in car lots at 4.60c. and 5c. to 5.25c. in small lots; Pig Tin at 31¼c. to 31⅜c. in car lots and 32c. to 32½c. in less than car lots. Spelter is in slow demand, the car lot price being 5.75c. and the small lot price 6c. Sheet Zinc is held at $7.50, base, La Salle, equivalent, after deducting discounts, to $7.25, Chicago, for car lots of 600-lb. casks, with small lots selling at $7.50 to $8. Prices of Old Copper and Brass are as follows: Copper Wire, 13¼c.; Heavy, 13c.; Copper Bottoms, 12c.; Copper Clips, 12¾c.; Red Brass, 11¾c.; Red Brass Borings, 9¾c.; Yellow Brass, Heavy, 8½c.; Yellow Brass Borings, 7¾c.; Light Brass, 7c.; Lead Pipe, 4¼c.; Tea Lead, 3.85c.; Zinc, 4.35c.; Pewter, No. 1, 19¼c.; Block Tin Pipe, 25c.

Coke.—The long period of activity among buyers of Foundry Coke has led to a reduction in prices on the part of some Connellsville producers, the figures reported this week ranging from $2.60 to $2.85, Connellsville, or $5.25 to $5.50, Chicago, while Furnace Coke from the Connellsville region is quoted at $2 at the ovens, or $4.65, Chicago. Wise County, Va., Cokes are freely offered at from $2.65 to $2.75, or $4.90 to $5, Chicago.

Hickman, Williams & Co., Pig Iron and Coke merchants, have removed from the eleventh to the fourth floor of the Rookery Building, Chicago.

Joseph Lieberman, dealer in Old Materials, has removed from 206 La Salle street to Room 502, Monadnock Block, Chicago.

The Coremakers' and Iron Molders' Union, at Hartford, Conn., has demanded an increase from $2.75 to $3 per day. The foundrymen have refused to grant the raise.

Philadelphia.

FORREST BUILDING, May 9, 1905.

The Iron and Steel trades are in a condition to cause perplexity, but there appears to be nothing to warrant any great anxiety. The demand for Pig Iron has dropped off to almost nothing, but it has yet to be shown that consumption is decreasing, and while that continues there need be no great anxiety in regard to either the Iron or Steel trade. The monthly report of Pig Iron production will be published in this issue and will throw a much desired light on these points, but until the facts are known it would not be safe to venture a prediction, although the report is hardly expected to be as favorable as that of the preceding month. Two million tons of Pig Iron per month is a very large tonnage, and if production is getting beyond that, or if consumption is not keeping pace, the weakness in prices will not be hard to account for. As a rule, however, deliveries are well taken, and furnace banks appear to be kept clear of accumulations, except the usual odds and ends of misfits, &c. The weakness in Scrap Material has had some influence, and as a matter of fact sentiment is far less optimistic than it was two or three months ago, although substantial reasons for any such change of feeling are difficult to find. The furnace report may throw new light on the situation, and waiting for that may be the cause for a temporary holding up of new business. Finished products seem to hold their own very well, although there is an unevenness which is not altogether satisfactory. Heavy materials are in unusually good demand and slight advances have to be paid on shipments this side of July. Light products, however, are a little slow and prices on such are not fully maintained, although the reaction may be of short duration. May and June will test the situation very thoroughly, but if within that period nothing unfavorable develops in regard to crops or financially, the chances for an active recovery in the demand are fairly well assured.

Pig Iron.—The dullness noted during the past several weeks is still unbroken and looks like continuing for some time longer. Prices are not quotably lower, but those who can take fair sized lots can probably do a little better than could have been done at any time within the past 30 days. Nos. 3 and 4 Foundry and low grade Mill Irons are in good supply and can be had at comparatively low figures; but other grades are nominally unchanged, although they are easier and in some instances prices have been shaded, but not enough to make any change in quotations necessary. Forecasts in regard to the future would be extra hazardous at the present time, although the monthly furnace report, which is expected to be published within the next 24 hours, may give a pretty good idea of how things will shape themselves, but in the meanwhile anything that could be said would necessarily be a mere guess. So far deliveries have been well taken, but there is little pressure for business from the Southern furnaces, and unless something favorable develops in the immediate future it is feared that it will be difficult to maintain prices. No. 2 X Foundry is offered at $17.50, and on firm offers for good sized lots it is believed that less would be accepted. The general range of prices for Philadelphia and nearby deliveries are about as follows:

No. 1 X Foundry	$18.00 to $18.25
No. 2 X Foundry	17.50 to 17.75
No. 2 Plain	17.00 to 17.25
No. 3 Foundry	16.25 to 16.50
No. 4 Foundry	15.50 to 16.00
Standard Gray Forge	16.00 to 16.25
Basic	16.75 to 17.00
Low Phosphorus	20.50 to 20.75

Ferromanganese.—There is no business under way at present; asking prices, however, are about $48, ex-ship, or in small lots $49 to $49.50, delivered at nearby points.

Steel.—There is a fair inquiry, although buyers hesitate in placing large orders. Small lots command $28.50 to $29, with $28 as an inside figure for the best class of orders.

Muck Bars.—There is no demand of any account, but sellers appear to be firm at about $29, f.o.b.

Plates.—Reports are somewhat uneven in regard to this interest, but the general average is very satisfactory. Most of the mills have specifications to run them until midsummer, with a very considerable tonnage to be specified after that date. New business is pretty good, but is hardly as urgent as it was two or three months ago, but the outlook is on the whole considered very satisfactory. Prices unchanged, but May and June shipments command a slight premium:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, over 14 inches wide	1.73½	1.78½
Tank, Bridge and Boat Steel, rectangular Plates, 14 inches wide and under	1.63½	1.68½
Flange or Boiler Steel	1.83½	1.88½
Marine, A. B. M. A. and Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Per 100
3-16-inch thick	$0.10 pounds extra.
Nos. 7 and 8, B. W. G.	.15 "
No. 9, B. W. G.	.25 "
Plates over 100 to 115 inches	.05 "
Plates over 110 to 115 inches	.10 "
Plates over 115 to 120 inches	.15 "
Plates over 120 to 125 inches	.25 "
Plates over 125 to 130 inches	.50 "
Plates over 130 inches	1.00 "

Structural Material.—This department continues to take a leading position in point of activity, with most excellent prospects for its continuance. Deliveries are in some cases a month or six weeks behind, and it is only for certain sizes that fairly prompt shipments can be guaranteed. Official prices are unchanged as follows: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.65c. to 1.68c.

Bars.—The Bar trade is not as uniformly active as it was some time ago, but most of the leading mills are having all they can do to keep up with their deliveries. New business is somewhat irregular, some large orders are being placed, but in other instances there is a disposition to defer business in the hope that prices will ease up in accordance with the decline in Scrap Material; but on the whole prices are well maintained at 1.73½c. to 1.80c. for best Refined Iron, price according to quality; Steel Bars firm at 1.63½c. to 1.70c., according to specification.

Sheets.—The demand is not urgent, as buyers seem to have become a little pessimistic in regard to prices. Makers are very firm, however, and under the increased cost of production are not disposed to make concessions from last week's prices, which are about as follows: 18 to 20 gauge, 2.40c.; 22 to 24 gauge, 2.50c.; 25 and 26 gauge, 2.60c.; 27 gauge, 2.70c., and 28 gauge, 2.80c. Best grades are two to three tenths higher.

Old Material.—Buyers seem determined to hold off and, as holders have confidence in a better market, it is almost impossible to negotiate sales. Sellers claim that what material they have cost them high prices and that they will carry it until the market improves, which they claim cannot be delayed much longer. The following quotations are as near the market as can be given when there is practically no business doing, deliveries in buyers' yards:

Scrap Rails	$16.75 to $17.00
No. 1 Steel Scrap	16.00 to 16.50
Old Steel Axles	20.00 to 20.50
Old Iron Axles	25.00 to 25.50
Old Iron Rails	22.50 to 23.00
Old Car Wheels	16.00 to 17.00
Choice Scrap, R. R. No. 1 Wrought	19.00 to 19.50
No. 1 Yard Scrap	17.50 to 18.00
Long and Short	16.50 to 17.00
Machinery Scrap	15.25 to 15.75
Low Phosphorus Scrap	21.50 to 22.50
Wrought Iron Pipe	14.50 to 15.00
No. 1 Forge Fire Scrap	15.50 to 16.00
No. 2 Light Ordinary	12.00 to 12.50
Wrought Turnings	13.50 to 14.00
Axle Turnings, Choice Heavy	14.50 to 15.00
Cast Borings	10.00 to 10.50
Stove Plates	11.00 to 11.50

Cincinnati.

FIFTH AND MAIN STS., May 10, 1905.—(*By Telegraph.*)

Pig Iron.—The condition of the market during the week just closed has been anything but satisfactory, and things are abnormally quiet. There have been very few sales made outside of a small number of scattering lots that are always expected, and which taken as a whole amount to very limited tonnage. The general foundry business continues exceedingly quiet, and viewed locally is without special feature. The report is, however, that concerns engaged in the manufacturing of specialties along this line are an exception to this rule and are melting considerable Iron. Since our last report Southern Iron has declined another 25c., and is now freely offered at $13, Birmingham, basis. Even this has failed to interest consumers to any great extent, who are evidently waiting for further developments. A large number of consumers are known to be fully covered until into the summer, and the present halt in the buying movement is evidence that they have decided to remain passive until the settling of prices and a firm basis is again established. In reality there has not enough business been transacted during the week to fix prices, and while some furnaces are endeavoring to keep the schedule up to prices of a week or two since it has proven futile, and we are told that it is possible to secure any tonnage desired at the minimum quotation of today. Northern Iron is still quoted at $15.75, furnace, and very quiet. The inquiry of last week for 500 tons of Basic for Detroit was taken by an agency in this city at a shade below market quotations. A sale of 400 tons was also made to a consumer of this city. This was Southern Iron on analysis basis, and was sold on practically a $13 basis. These two sales represent the week's business. There is not a single inquiry of any size reported for the coming week. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$16.25 to $16.50
Southern Coke, No. 2	15.75 to 16.00
Southern Coke, No. 3	15.25 to 15.50
Southern Coke, No. 4	14.75 to 15.00
Southern Coke, No. 1 Soft	16.25 to 16.50
Southern Coke, No. 2 Soft	15.75 to 16.00
Southern Coke, Gray Forge	14.75 to 15.00
Southern Coke, Mottled	14.25 to 14.50
Ohio Silvery, No. 1	20.40 to 20.65
Lake Superior Coke, No. 1	17.15 to 17.40
Lake Superior Coke, No. 2	16.65 to 16.90
Lake Superior Coke, No. 3	16.15 to 16.40
Car Wheel and Malleable Iron.	
Standard Southern Car Wheel	$18.50 to $19.00
Lake Superior Car Wheel and Malleable	18.00 to 18.50

Coke.—Spot Coke is reported weak, with an abundance on market. Prices are irregular and for the most part a shade lower. We quote the best grades of Connellsville Foundry from $2.50 to $2.60, f.o.b. ovens.

Plates and Bars.—Specifications are said to be coming in a little more slowly at present and the market is more quiet than it has been for a month or more. Prices, however, are unchanged. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same in small lots, 1.85c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.83c., in carload lots.

Old Material.—In harmony with the Pig Iron market there is a slight decline in quotations. Dealers as a rule have disposed of their stock and say that they expect a quiet time until the middle of summer. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $15 to $16 per net ton; No. 1 Cast Scrap, $12 to $12.50 per net ton; Iron Rails, $18 per gross ton; Steel Rails, rolling mill lengths, $13.50 per gross ton; Relaying Rails, 56-lb. and upward, $23 per gross ton; Iron Axles, $19.50 to $20 per net ton; Car Wheels, $16 to $17 per gross ton; Heavy Melting Scrap, $13 per gross ton; Low Phosphorus Scrap, $16 to $16.50 per gross ton.

Birmingham.

BIRMINGHAM, ALA., May 7, 1905.

The weakness of the Iron market as indicated in letter of last week, was accentuated during the week just closed. There was not only no recovery of price, but there was a further recession in price, but this was not general. All buyers could not obtain Iron on the basis of $13 for No. 2 Foundry, but some buyers could and some buyers did obtain it. And the sellers at this price did not include all the interests. Some held out and let the business go to those to whom it was acceptable. The sales made at this price can be called special, and their object was to try and put some life into the trade, but it was successful to only a moderate degree. The trade would not wake up and the amount of business concluded was of very limited volume. It was the quietest week we have had for some time. Some sales of No. 2 Foundry are reported at $13.25 and some at $13.50. At the latter price they were unimportant and in course of current business. At the minimum price you can find out nothing as to details, except that the price was necessary to make it go. In fact, no one will admit selling at this price; but the information is so positive and direct that it admits of no doubt. The lots sold were of moderate volume only, and they failed to create an active demand. In the way of the regular order of business some Basic Iron was sold at $14 and some Gray Forge at $12.75. Some small lots of Gray Forge were also sold at $12.50, and there was one export order sold at (it is said) $12.75 for No. 3 Foundry, say, three cars. The first half of the week some No. 2 Foundry sold at $13.50 and some Charcoal Iron went at $17, but there was an absence of vim from the market during the entire week.

With the market in this condition it seems strange that buyers who have deliveries maturing should be "wiring" and "'phoning" to sellers to anticipate their shipments and rush them so that they can keep their works going. In one case where 2000 tons were due the buyers in June they notified sellers that they would like shipment just as fast as they could make, without waiting for maturity of contract. These requests are common, and the inference is that the majority are carrying nominal stocks and chancing the price for the second half of the year.

The Williamson Furnace is preparing to go into blast again and their plans contemplate that they will be making Iron before the close of this month. The report is in circulation that this property has the Dimmick Pipe Works as the owner. The Pipe works are buyers of Iron and not makers of it; and, as an organization, they have no financial interest in any furnace property. A few, and but a few, of the parties interested in the one are interested

in the other, and the management of each is entirely independent of the other.

In the Scrap Iron market there is a very quiet time, and since last report there has been some weakening in prices; but it would take some trading to establish accurate quotations. The figures given are nothing more than an approximation, as parties who are interested in the trade report that there has of late been no trading of moment to establish quotations. Open Hearth Scrap is still quoted at $14 to $17; Heavy Cast Steel, $14.50 to $15; Stove Plate, $11.50 to $11.75; Old Iron Rails, $18 to $19; Old Steel Rails, $15; Iron Car Axles, $20 to $21; Steel Car Axles, $15.50; Old Car Wheels, $15.50 to $16.

Both Coal and Coke are reported as in good demand and the former is quoted at $1.25 to $1.35 for the run of the mines, and with a demand that absorbs the output. Coke is supplied to the furnaces at $3.75, and there are probably instances where this price has been shaded to $3.50; but quality Coke is holding its own. Foundry Coke is yet quoted at $4. All the interests identified in the making of Coke have materially increased their output in the immediate past and will probably have no backset now for a long period. It has been determined to reline two of the Bessemer furnaces, concerning which it was in contemplation to put them into service as soon as fuel was assured to keep them going. This action will cause a delay of several weeks in adding to output.

Aroine Wales, the treasurer of the Russell Engine Company of Massillon, Ohio, is here to establish a branch office of the Massillon plant, after establishing other branches at New Orleans and Dallas and Houston, Texas. The general outlook for business continues good and the prospects for continued activity in industrial lines is very favorable. What we most need now is a steady supply of labor. In that we are short.

Pittsburgh.

PARK BUILDING, May 10, 1905.—(*By Telegraph.*)

Pig Iron.—The monthly report of J. G. Butler, Jr., of the Bessemer Pig Iron Association shows that the percentage of blast furnaces in operation using Lake Superior Ore was exactly the same on May 1 as on April 1. The Steel Corporation had in operation on May 1 96 per cent. of its total furnace capacity; the Republic Iron & Steel Company, 100 per cent., and the Bessemer Pig Iron Association, 100 per cent. The only event of an otherwise very quiet week in the Pig Iron trade was the purchase by the Cambria Steel Company of approximately 40,000 tons of Bessemer Iron for May, June and July delivery, the May Iron being $15.50, at Valley furnace, while the price of the June and July Iron was not reported. There is practically no demand for either Bessemer or Basic Iron, and it is finally settled that the Steel Corporation will not buy any Pig Iron for May delivery. The nominal price of Bessemer and Basic Iron is $15.50, Valley furnace, but on a firm offer and for prompt shipment some sellers might shade this price about 25c. a ton. There is very little inquiry for Foundry and Forge Iron, and some of the foundries have canceled Iron on which the furnaces were behind on deliveries. We quote Northern No. 2 Foundry at $15.75 to $16, Valley furnace, but on a firm offer and for any considerable tonnage some furnaces might slightly shade our lower price. Northern Forge Iron is held at about $14.75, Valley furnace, or $15.60, Pittsburgh, but there are reports of several small sales slightly under this price.

Steel.—Billets, Sheet and Tin Bars for prompt delivery are still scarce and readily command premiums over official prices. There is some inquiry for Steel and Tin Bars for shipment over the last half of the year, and some tonnage has been sold on the basis of $25, maker's mill. Bessemer and Open Hearth Billets up to 0.20 carbon for prompt delivery are held at about $24, and Sheet and Tin Bars, $26 to $26.50, maker's mill.

Steel Rails.—The report is confirmed that the Pennsylvania Railroad has placed an additional order for 35,000 tons of Steel Rails for this year's delivery, of which Cambria Steel Company got 18,000 tons, Carnegie Steel Company 10,500 tons and the Pennsylvania Steel Company 5000 tons.

(*By Mail.*)

The decided lull in the Iron trade referred to in our report last week continues, and the demand for Pig Iron, Sheets, Tin Plate and other forms of Finished Iron and Steel is very quiet, with an easier tone in prices. The tonnage in Steel, Structural Shapes and Plates is very heavy, and the mills are sold up for some months ahead. The present quietness in demand is really a natural one, and is due to the fact that in the winter months, commencing with November, all the mills ran to fullest capacity, shipping their products to the large jobbers throughout the country, filling them up with heavy stocks at a time when there was little demand for Material. These stocks are now in the warehouses of the jobbers, and will have to be moved before the mills can reasonably expect a fresh demand. This is particularly the case with Sheets, Tin Plate, Pipe and Wire products, and on these products jobbers report that stocks are moving out more freely than for some time. There is no special uneasiness felt regarding the present lull, but it is believed that if it continues into July or August we may naturally look for some recession in prices. General conditions throughout the country are very good, consumption of all kinds of Iron and Steel being heavy, money plentiful and the crop outlook good.

It is quite certain that we have reached the maximum output in Pig Iron and Steel, and very little, if any, increase in production of these can be reasonably expected. On the other hand, there is every probability of a slight falling off in output of Pig Iron, as the large interests are driving their blast furnaces at an unprecedented rate, which can hardly be maintained for any considerable length of time. The output of Steel Billets, Sheet and Tin Bars is enormously heavy and cannot be increased, as all the Steel plants are running to absolutely maximum capacity, and are making new records of output almost every day. With these conditions it can readily be seen that there is no special cause for worriment over the present lull, and if we can get over the next two months without serious disturbance tonnage in the last half of the year will undoubtedly be very heavy.

In the Pig Iron trade the only event of interest in an otherwise very quiet week was the purchase of 40,000 tons of Bessemer Iron by the Cambria Steel Company from the Snyder interests for May and June delivery at $15.50, Valley furnace, for the May Iron. Deliveries on this Iron are now going forward. It is pretty well settled that the Steel Corporation will not buy any Iron this month, but may possibly need some in June. The normal price of Bessemer and Basic is $15.50, Valley furnace, but some Iron is being offered at about 25c. a ton under this price. There is absolutely no inquiry for Foundry and Forge Iron and prices on both are weak. The normal price of Northern No. 2 is $16, Valley, but on a firm offer and for prompt shipment some furnaces would shade this from 25c. to 50c. a ton. Some foundries are postponing shipments on Iron and this is causing some metal to accumulate, which the furnaces are anxious to move. Northern Forge Iron is about $14.85, Valley furnace, or $15.70, Pittsburgh. The Scrap market is exceedingly dull and prices have gone off in the past two weeks from 50c. to $1 a ton.

We note a continued active Steel market, the mills being sold up for several months ahead and still behind in deliveries. There is some inquiry for Sheet and Tin Bars for last half, on which some mills are quoting $25, at mill, for Cut Bars.

In Finished Iron and Steel demand for Plates and Structural Shapes is very heavy, but the balance of the list is rather quiet. The Pipe market, in which there has been some uneasiness in prices and a very light demand, is showing some betterment in both. Demand for Tin Plate and Sheets is quiet, jobbers having heavy stocks, which they want to move before placing new orders.

The order for 10,000 tons of Steel cars placed last week by the Baltimore & Ohio, and which has been expected for some time, ought to cause increased activity in such lines of Finished Iron and Steel as go into the manufacture of cars. Of this order the Pressed Steel Car Company took 2000, Standard Steel Car Company 1500 and Cambria Steel Company 2000. The Cambria Steel Company will roll the Plates which go into its cars, while the Plates and other shapes for Standard and Pressed Steel Car companies will largely be furnished by the Carnegie Steel Company. The order for the 80,000 car wheels will largely be filled by car wheel plants in the Pittsburgh district, and this will no doubt cause an increased inquiry for Foundry Pig Iron. The Pressed Steel Car Company really secured 3000 cars, as it practically controls the Western Car & Foundry Company, which got an order for 1000 cars.

Ferromanganese.—The market has quieted down a good deal as consumers are covered for some time ahead, in some cases through first half of next year. We quote foreign 80 per cent. Ferro at $49 to $50 in large lots and $51 to $52 in small lots, delivered at buyer's mill.

Rods.—The quiet condition existing for some months in the Wire trade is reflected in Rods, which are dull in demand. Prices, however, are fairly firm, due to the strength of the Steel market. We quote Bessemer and Open Hearth at $34 and Open Hearth Chain Rods at $35, maker's mill.

Skelp.—The market is very quiet and a leading Skelp mill in the Pittsburgh district has been shut down for nearly two months for lack of orders. We quote Bessemer Grooved Skelp at 1.55c. and Open Hearth at 1.60c., with $1 advance for Sheared. Grooved Iron Skelp is about 1.60c. to 1.65c. and Sheared about 1.70c. As practically no new tonnage has been placed in this market for some time, actual prices of Skelp are somewhat hard to determine.

Steel Rails.—Railroads are pursuing the policy of placing such orders for Rails as cover actual requirements only. There is a good deal of inquiry for Rails for export. Some

enormous records for output are being made in the Rail mill at the Edgar Thomson works. We quote Standard Sections at $28 at mill and Light Rails at $24 to $27, depending on weight.

Plates.—The contract for 10,000 cars placed last week by the Baltimore & Ohio means a consumption of approximately 120,000 tons of Plates and Small Shapes. Much of this tonnage will go to Carnegie Steel Company, Jones & Laughlin Steel Company and Cambria Steel Company, the latter rolling Plates and other shapes for the 2000 cars which it received. The leading Plate mills, such as Carnegie, Jones & Laughlin, American Steel & Wire Company, La Belle and others, are sold up for anywhere from two to six months. On some sizes the Carnegie Steel Company is practically out of the market for balance of this year. It is stated that in some cases slight premiums have been paid on Plates for spot shipment. Prices are very firm, and we quote: Tank Plate, ¼-inch thick, 6¼ to 14 inches wide, 1.50c., base; over 14 inches wide and up to 100 inches in width, 1.60c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edges	$0.10
Gauges No. 7 and No. 8	.15
Gauge No. 9	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
Marine, "A. B. M. A.," and ordinary Fire Box Steel Plates	.20
Still Bottom Steel	.30
Locomotive Fire Box Steel	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.40c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Structural Material.—The Structural trade is very active, and some good sized contracts have been placed during the week. It is said the American Bridge Company is practically filled up for the next three months, while other Structural interests report tonnage very heavy. The Fort Pitt Bridge Company has taken a contract for some Steel buildings for the Pipe mill additions of Spang, Chalfant & Co. The market is firm and we quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles; 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.60c.; Angles, 8 x 8 and 7 x 3½ inches, 1.70c.; Zees, 3-inch and larger, 1.60c.; Tees, 3-inch and larger, 1.65c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—Demand for Sheets is very quiet, due to the fact that jobbers have very large stocks, which they desire to move out before placing more orders. Some of the outside Sheet mills that have Bars bought at official prices, or on sliding scale contracts, are inclined to shade prices on Sheets from $1 to $2 a ton, and this is also true of jobbers who have large stocks bought when prices were lower than they are now. The shading in prices of Sheets does not exceed $2 a ton at the utmost, and some mills that are pretty well filled up are holding to official prices. However, the new tonnage actually placed since the last advance of $2 a ton went into effect has been relatively small and some mills that have pretty well cleaned up contracts are in urgent need of orders and will shade prices to secure them. Prices quoted by the mills, which are shaded more or less, depending on the order, are as follows: Black Sheets, No. 24, box annealed, one pass through cold rolls, 2.15c.; No. 26, 2.25c.; No. 27, 2.30c., and No. 28, 2.40c. We quote Galvanized Sheets as follows: Nos. 22 and 24, 2.85c.; Nos. 25 and 26, 3.05c.; No. 27, 3.23c.; No. 28, 3.45c. We quote No. 28 Gauge Painted Roofing Sheets at $1.75 per square, and Galvanized Roofing Sheets, No. 28 Gauge, at $2.95 for 2½-inch corrugation. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—New tonnage in both Iron and Steel Bars has shown a falling off in the past two weeks, but this is really desired by the mills rolling Steel Bars, as it will give them a chance to catch up on delayed deliveries. The decline in prices of Scrap has had a sympathetic effect on Iron Bars, which have gone off at least $1 a ton. The mills are pretty well filled up on contracts placed when prices were lower than they are now, and buyers are specifying on these contracts very freely. We quote Common Iron Bars at 1.55c. to 1.60c., Pittsburgh, but on a firm offer some mills might slightly shade the lower price for desirable specifications. We quote Bessemer and Open Hearth Steel Bars at 1.50c., base, for carload lots.

Hoops and Bands.—A fair amount of new tonnage is being placed, but shipments of the mills are mostly on old contracts made at low prices. We quote Steel Hoops at 1.65c. and Bands at 1.50c., extras on the latter as per National Steel Bar card.

Cotton Ties.—As noted last week practically all the tonnage in Cotton Ties for this season's trade has been placed and the mills are now at work filling these contracts. We quote at 85c. per bundle for 3000-bundle lots and over.

Tin Plate.—There is practically no new business being placed in Tin Plate, the mills running on old contracts, most of which were placed when prices were lower than they are now. Jobbers' stocks are very heavy and these will have to move out to consumers before much improvement in new business can reasonably be expected. We quote 100-lb. Cokes at $3.50 to $3.55, f.o.b. Pittsburgh, terms 30 days, or 2 per cent. off for cash in 10 days.

Merchant Pipe.—Conditions in the Pipe trade are slowly showing improvement, but not to the extent that the mills would like to see it. Reports of demoralization in prices of Pipe are to some extent true, but have been exaggerated. The situation seems to be that in the winter months, starting with November, the Pipe mills ran to full capacity, turning out an enormous tonnage, which was shipped to the leading jobbers and most of which is yet in their hands. The demand for Pipe has not been by any means as large as expected by the jobbers and they are showing some uneasiness over the slow way in which their stocks are moving. To hasten the moving of these large stocks of Pipe the jobbers have been cutting prices rather vigorously, while the outside mills have not followed the successive advances made in Pipe by the leading interest and are to-day naming discounts that are two points, or about $4 a ton, lower than those of the leading interest. Competition among the outside mills has been very severe, and in some cases prices have been made on Pipe that were below actual cost of making it. Now that Pipe is moving out more freely it is believed the tone of the market will become stronger and higher prices by the outside mills are not improbable. Carload discounts to consumers, which are shaded by the outside mills to the extent of about two points, are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black. Per cent.	Galv. Per cent.	Black. Per cent.	Galv. Per cent.
⅛ and ¼ inch	67	51	65	49
⅜ and ½ inch	71	59	69	57
⅝ to 6 inches	75	65	73½	63½
7 to 12 inches	70	55	68½	53
Extra strong, plain ends.				
⅛ to ⅜ inch	60	48	58	46
½ to 4 inches	67	55	65	53
4½ to 8 inches	63	51	61	49
Double extra strong, plain ends, ¼ to 8 inches	56	45	54	43

Boiler Tubes.—Demand for Locomotive Tubes continues very heavy and is nearly as large for Merchant Tubes, the mills rolling Tubes being from four to eight weeks behind in deliveries. Prices are firm, any unevenness existing being among two or three outside mills that do not cut much figure in the Tube market. Carload discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ inches	41	44
1⅝ to 2¼ inches	41	56
2½ inches	46	58
2¾ to 5 inches	53	64
6 to 13 inches	41	56

Merchant Steel.—A fair amount of tonnage is being placed, but large Implement makers are hesitating about making new contracts, owing to the present lull, which to some extent indicates lower prices. We quote: Smooth Finished Tire, 1.70c.; Railway Spring Steel, 1.70c.; Cutter Shoes, 2.15c. to 2.20c.; Toe Calk Steel, 2c. to 2.05c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Smooth Finished Machinery Steel, 1.70c. to 1.75c.; Crucible Tool Steel, ordinary grades, 5¾c. to 8c.; extra grades, 10c. and upward. Demand for Shafting is fairly active and we quote Cold Rolled at 50 per cent. off in carloads and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—Demand is not quite so active, but the mills are well filled up for the next month or two. We quote Spikes at $1.70 per 100 lbs., f.o.b. mill.

Spelter.—Demand is very dull and prices have gone off still further. Prime grades of Western Spelter are quoted at 5.60c., St. Louis, or 5.72½c., Pittsburgh, but this price could be shaded on a firm offer.

Coke.—Owing to dull demand for Coke and the steady decline in prices it is probable some of the smaller plants in the region will soon shut down until trade improves. The Union Works, with 70 ovens, has already closed. The Frick Coke Company is shipping all the Coke it is making, and stocks were reduced about 15,000 tons last week. The report is absolutely untrue that the Frick Coke Company will buy the Rainey interests. Strictly Connellsville Furnace

Coke for spot shipment is held at $1.80 to $1.90, at oven. Connellsville 72-hour Foundry Coke is $2.50 to $2.75 a ton, at oven. Output last week in the Upper and Lower Connellsville region was about 345,000 tons.

Iron and Steel Scrap.—The Scrap market is absolutely lifeless as far as buying is concerned, and prices have gone off about $1 a ton. Consumers have heavy stocks, and will not take in Scrap at any price, and already a number of contracts on which shippers were behind in deliveries have been canceled. We have reduced prices all along the line, and now quote: Heavy Melting Scrap, $15; No. 1 Wrought Scrap, $17.50; Bundled Sheet Scrap, $14; Cast Iron Borings, $10; Wrought Turnings, $12.50; Machinery Cast Scrap, $15; Steel Rails, short pieces, $15; long pieces, $15.50, and Old Iron Rails, $20, all in gross tons, f.o.b. Pittsburgh. We note a sale of 300 tons of No. 1 Wrought Scrap at $17.50, gross ton.

Cleveland.

CLEVELAND, OHIO, May 9, 1905.

Iron Ore.—The movement of Iron Ore down the lakes has begun to limber up considerably. The shipments away from the head of the lake ports show a total of 1,100,000 tons for the month of April, or a big gain over two years ago. No Iron was shipped in April last year. The shipments did not all reach Lake Erie ports during the month by any means, since the largest shipments were toward the end of the month, when the docks began to work more freely and the movement was not encumbered by frozen Ore in the pockets. With the better movement, however, the shippers are about able to take good care of their contract vessels, having very little material to offer to the wild boats. There being a small demand for wild boats at present, there is not much of a discussion of rates, and these have remained steady at 75c. from Duluth, 70c. from Marquette and 60c. from Escanaba.

Pig Iron.—The market at the present time for Foundry Iron is extremely easy. There is very little buying for the future, and most of the foundries are so well supplied through their contracts that their present needs are modest. The prices in some instances have eased off, but nothing has been heard better than $15.75 in the Valleys for No. 2. Some of the furnaces are not in any too strong position as to future business and are a little anxious over the outlook. Some of the furnaces, on the other hand, are very strong, being well supplied with orders for a good while to come. There is a tendency to watch the progress of the Southern market. Some of the furnaces in the Birmingham district have been offering No. 2 Iron in this territory as low as $13, Birmingham, and a good inquiry might further disturb values. In the main, however, most of the Southern furnaces are still disposed to hold for the old price of $13.50, Birmingham, even for delivery in this territory. To the prices which are charged is to be added the freight rate of $3.85 to make up the Cleveland price for the material. This has had a tendency to weaken the Northern prices on Foundry Iron. There is hardly any change in the situation as to Bessemer and Basic. The Coke market, however, has weakened materially under the liberal supply and the lessening demand. The producers of the best grades of Foundry Coke are now selling their product at prices ranging from $2.75 to $3 at the oven, although the producers of some of the poorer grades of 72-hour Coke are selling as low as $2.50 at the oven. In the main, however, the market is represented by the higher prices. Furnace Coke is selling for $2 to $2.25 at the oven.

Finished Iron and Steel.—A weakening tendency has been detected in the Sheet market through the rather strenuous efforts of some of the smaller mills to sell their output. The demand has been slackening during the past few days and the mills report a smaller supply of new orders available when the present orders have been filled. The larger mills have enough business on hand to keep them busy for several months to come and are not worried much over the prospect of light business for some time to come. The jobbers here who have been doing the major part of the business principally out of stock report that their stock business is still good. There has been somewhat of an improvement in the demand for Standard Rails. One concern sold 5000 tons the latter part of the week, while the others have received some good inquiries, one which amounted to 10,000 tons to be placed soon. The order if placed will be followed by several other good sized lots. There has been no change in the Billet situation, the mills being well filled with orders for some time to come. There is an urgent demand for the forging quality, and in instances where the demand is immediate the material is obtained by a peddling process. Premiums running $2 to $4 a ton are being paid for the product. The Structural and Plate situations are still strong. There is not much new business, but all consumers are specifying heavily against their old contracts, taking all the material for which they have contracted. In some instances Structural is selling at 1.65c. at the mills, with an additional freight, which brings the price in Cleveland about $2 to $2.50 above the present association price. Some of the smaller mills are quoting Plates at 1.85c. at the mill, with an 18c. freight rate added. There is a fair amount of business being done at these figures. The Bar Iron market is a little weak for the time being. Most of the mills are not much concerned about the state of the market, being filled with orders to July 1, and intending to close for repairs on that date. The other mills, however, have no such orders. The ruling price is 1.60c. to 1.65c., Youngstown, although some sales are reported as low as 1.55c., Youngstown, while one or two mills have sold as low as 1.50c. at the mill. The Bar Steel situation is fairly strong. The general buyers are taking all the material for which they have contracted, but are not placing any new orders. The agricultural implement works will not be in the market for their next year's supply for some time yet. In the meantime the market has a waiting appearance.

Old Material.—The Scrap market has continued to be decidedly weak. The mills which have been the best customers are preparing to close for their customary improvements during the summer and are not buying, having a good supply on hand. The other consumers have been taking material sparingly, since they believe the present prices are too high. In some instances dealers are forced to sacrifice material on hand. Quotations are in the main nominal, since business has been so light, but a careful survey of the market makes the following quotations fairly representative, all gross tons: Old Steel Rails, $16 to $16.50; Old Iron Rails, $22.50 to $23; Old Car Wheels, $15 to $15.50; Heavy Melting Steel, $15.50 to $16. All net tons: Cast Borings, $8.50 to $9.50; No. 1 Busheling, $14; No. 1 Railroad Wrought, $16 to $16.50; Iron Axles, $21 to $22; No. 1 Cast, $13.50; Stove Plate, $10 to $10.50; Iron and Steel Turnings and Drillings, $11 to $11.50.

The Appraisement of Imported Merchandise.

On May 6 the Board of United States General Appraisers, in a decision written by General Appraiser Hay and concurred in by the other members of the customs court, made an important ruling which is of interest to all importers. It was determined that appraisers of customs cannot impose increased valuations on imported merchandise not actually before them for examination. Invoices covering a variety of goods cannot be advanced over entered values as units. Hereafter it will be necessary for appraisers to have at least samples of each kind of merchandise actually before them as a condition to making advances. It appears that H. S. Beers entered at New York a large invoice of goods embracing many varieties of articles. Fifteen cases in all were stated on the invoice, but only five were taken to the appraiser's warehouse and examined by the customs officials. One of the cases not taken to the Federal warehouse and differing in kind from the packages in the possession of the customs authorities was advanced in value over invoice prices by the local appraiser. Collector Stranahan, acting on the report of the appraiser, exacted duties on the package on the increased valuation found by the appraiser. Upon appeal to the Board of Appraisers Mr. Beers maintained that as the appraiser did not have the merchandise involved in the suit actually before him the official's action was null and void. Judge Hay, in sustaining the importer's contention, says that the appraiser was clearly in error in imposing advances over invoice values when the goods in question, or samples representative of the merchandise, were not before him for examination and appraisement. Collector Stranahan is ordered to refund to the importer the extra duties imposed by the appraiser.

A Power House at Joliet.

CHICAGO, ILL., May 9, 1905.—A syndicate including several officers of the Illinois Steel Company has secured riparian rights along the Desplaines River from Joliet to Morris, at a cost stated to be $150,000. It is understood that the syndicate will erect a large power house at Morris developing 15,000 electrical horse-power, part of which will be used by the Illinois Steel Company's Joliet mills, and part sold to local lighting and traction interests. Coupled with this announcement is a statement that the Illinois Steel Company will erect a new merchant bar mill at Joliet, but this cannot be confirmed.

The Hastings Tunneling Shield System.

There are two subjects that have received more than ordinary attention from the engineering profession during the last few years and in that time have undergone a wonderful development. One of them is the construction of tunnels, particularly subaqueous tunnels, and the other the use of reinforced concrete in structural work. Each is and has been a very important line of work, but there has been nothing in common between the two. It has remained for C. G. Hastings, a tunnel engineer of many years' practical experience, to propose an association of the two in a subaqueous tunnel wherein reinforced concrete takes the place of cast iron or steel in the walls or shell. While the scheme has not yet been put into actual use its feasibility seems reasonable, and at any rate the idea offers suggestions that make it worthy of investigation.

Whatever may be said of the tunnel system the tunneling shield with which the inventor intends to construct the tunnel is no experiment, as it has been used with great success in the building of a noted tunnel which is now completed and in use.

The tunnel lining is to consist of metal reinforced concrete, forming an impervious artificial stone, molded into convenient segment blocks. Before taking up the tunnel proper it will be well to thoroughly understand the construction and manner of using the shield.

The tunneling shield, as may be seen from Fig. 1, consists of two concentric cylinders, one inside the other, united at the cutting edge by a series of radial ogee plates. Both cylinders extend from the cutting edge to the rear end of the shield, where they are united by a series of radial perforated segment plates. Intermediate of the ends the cylinders are mutually supported by longitudinal stiffeners, between which is formed a series of compartments, wherein are placed the hydraulic jacks that are used to advance the shield. These extend through the holes in the segment plates, being secured to them by lag screws passing through the bearing collars of the jacks. Within the hood, which is a continuation of the outer cylinder of the shield, the lining of the tunnel is built up, and to advance the movement of the shield the several hydraulic jacks react against the tunnel lining.

The interior of the shield is divided by vertical and horizontal walls into convenient working chambers of dimensions depending upon the size of the tunnel diameter. The vertical partitions are of truss construction and the horizontal partitions of plate metal, all being substantially reinforced by curved steel plates extending rearward from the cutting edge a certain distance to best resist any strains that may be brought to bear upon the partition members. The curved plates are so arranged as to deflect all soft sliding or inflowing material and to prevent excavated material at the heading from becoming lodged against flat or abrupt surfaces in the chambers. In this manner the material is caused to pass through the shield to the bulkheads, where any treacherous material may be easily controlled.

The bulkheads are provided with sectional perforated doors carried on heavy hinges, and can be conveniently opened in whole or in part as the occasion or condition may require. If saturated or unstable material is encountered the doors can be quickly closed in any or all chambers of the shield, leaving the perforations of the doors open for the passage of the material. This permits the continued forward movement of the shield, and so does not arrest the progress of the work.

If the material outside of the shield is of such an extremely soft character as to flow too freely through the door perforations, which might cause a settlement or displacement of the earth enveloping the outer periphery of the shield, the perforations can be quickly closed in any chamber, independently of the others, or in any part of a single door by sliding gates attached for that purpose, thus arresting the inflow of matter until the shield has been advanced into the heading sufficiently to compress the mud within the belled periphery of the shield, where it is concentrated, and may then be deflected in the regular course to the working compartments and, coming in contact with the sectional bulkheads may be removed through the doors.

If rock bowlders or other hard material is encountered the doors in a plane with such material may be thrown open while the obstruction is removed by drilling and blasting. When working in dry clay in a normally safe state the doors are entirely open for a free and rapid passage of the excavated material.

The rear hood of the shield is so designed that the tunnel lining in course of erection conforms very closely to the core made by the shield and presents any greater displacement of the surrounding earth than is necessary for the convenience of proper construction. This is particularly of advantage where the tunnel runs under streets or buildings and any settlement would be dangerous. Moreover, it insures a more uniform load on the tunnel and removes very largely the likelihood of later deformation.

It may be seen that the elementary features of the Hastings shield are of a practical character well adapting it to working where the conditions which will be met with cannot be definitely determined in advance, as in most underland and submarine construction. Its practicability through a soil of varied character was demonstrated when it was used in the construction of 4139 feet of 24 foot 9 inch bore on the main conduit of the Chicago intercepting sewer system. The strata formation consisted of varying materials, one underlying the other on part of the work, while on another section the work passed entirely through running gravel and saturated quicksands.

The impervious reinforced tunnel lining has for its foundation structure a series of metal reinforced segment blocks molded into a crystallized mass by an improved method without the use of tamping or pressure. The reinforcing is imbedded in proper positions to distribute the strains to which it is to be subjected. There are also embedded in the concrete blocks appliances to assist the work of erection. Each block is placed in position by a rotary segment hoist connected with the shield and pressure is brought to bear upon the blocks to force them into proper position by the hydraulic jacks which shove the shield forward. Elastic water proof pads are inserted in all circumferential and abutting joints of the blocks to aid in imbedding each ring of segments in perfect conformity with the erected work and to render all seams water proof. A coating of water proof material is applied to the inner surface of the segment blocks when each ring has been completed, after which a reinforcement of circular steel beams is placed in position. There is one beam to each ring of blocks, which is secured to them by appliances molded in the blocks at the time they are made. The circular beams are reinforced and stiffened by connecting longitudinal bars of special form attached at equal intervals around the circumferential beams. A suitable distance from the inner periphery of the beams and their connecting bars is placed a cylinder of expanded metal in spiral form or a netting of heavy steel wire, such as Page woven wire fencing. The inventor favors the latter as having some advantages over expanded metal. Over the netting is applied a homogeneous coating of cement concrete, completely imbedding all the metal reinforcement. The interior surface is then troweled to a smooth finish.

This system of concrete tunnel construction is recommended for tunnels for railways or traffic purposes of any kind, and is claimed to be of extreme durability and of decidedly moderate first cost as compared with tunnels made in accordance with present day practice. The inventor, Cornelius G. Hastings, has secured patents covering the essential parts of his inventions for the United States, Canada and Great Britain, and has other patents pending applicable to construction work of a mechanical and civil engineering nature.

The plant at Canton, Ohio, of the Aultman Company, which failed some months ago, was sold on Tuesday, May 8, to E. G. Tillotson, president of the Cleveland Trust Company, who represented the creditors' committee, for $262,500. The creditors, it is stated, will get only about 5 per cent. of their claims.

Metal Market.

NEW YORK, May 10, 1905.

Pig Tin.—Despite the fact that the market was rather erratic, with a wide variance between quotations, a considerable improvement was noted in the volume of business. Some idea of the fluctuation of prices is shown by the fact that on Monday sales were made at 30c. and on Tuesday as high as 30.25c. The arrivals so far this month have been fair, amounting to 695 tons. To-day's quotations for spot are 29.90c. to 30.10c.; May, 29.75c. to 30c.; June, 29.50c. to 30c.; July, 29.25c. to 29.75c. The recent sales and small arrivals have resulted in reducing the local stock of metal, but while there is no scarcity all the Tin here is in strong hands. Price of spot has declined in London to £136 12s. 6d., and futures are the same as last week at £134 10s., a difference of but £2 2s. 6d. as contrasted with the wide difference noted some weeks ago. The next public auction of Banca Tin will be held at Amsterdam, Holland, May 25, the amount aggregating about 1600 tons. About 1545 tons are afloat and scheduled to arrive this month.

Copper.—Notwithstanding the absence of any large demand for Copper from domestic consumers, prices are held at the figures of 15c. for Lake and Electrolytic and 14.75c. for Casting, but these prices are not cut to any extent, as the second hands have little Copper to sell. It is said that no large amount of Copper can be secured for delivery in May or June at the ruling prices. The export business continues large and there have been further inquiries for exportation to China. In London prices have advanced and spot quotations are held at £65 15s, with futures at £65 18s. 9d and Best Selected at £70 5s. The exports so far this month aggregate 4925 tons, of which 400 tons go to the Orient.

Spelter.—The market is dull and demand is light, prices declining further and to-day's closing quotation being 5.65c. to 5.70c. In St. Louis the same conditions prevail, with price at 5.45c. Efforts to force the prices of Ore down failed, and Ore is now held at $43 to $45. In London prices are practically unchanged, the closing price there being £23 10s.

Lead.—The market is firm, but business is of small volume, and prices are unchanged at 4.50c. to 4.60c. The American Smelting & Refining Company continues to quote shipment Lead at 4.50c. in 50-ton lots. In St. Louis Lead is held at 4.50c., and the London quotation is slightly lower at £12 16s. 3d.

Antimony.—This metal is very scarce, all grades being held at 8.75c. to 9c.

Quicksilver.—The market is practically unchanged, flasks of 75 lbs. being quoted at $38. The London market is quoted at £7 7s. 6d.

Nickel.—The tone of the market is quiet. Prices are practically unchanged, large lots being quoted at 40c. to 45c., and smaller quantities at 50c. to 60c.

Tin Plate.—Prices remain firm and business continues in large volume. The American Sheet & Tin Plate Company continues to quote $3.74 a box for 14 x 20 100-lb. Coke Plates, f.o.b. New York, or $3.55, f.o.b. Pittsburgh. Plates are now held in Swansea at 11 shillings 9 pence.

The gentlemen of the brass industry of the Naugatuck Valley who petitioned the Connecticut Legislature for the right to take the upper waters of the Naugatuck and its tributaries for the purpose of erecting large storage reservoirs have abandoned their plan. They have partly carried out the idea, however, by obtaining control of the Mad River Power Company, which controls the upper waters of Mad River, a tributary of the Naugatuck, entering the river at Waterbury, and benefiting directly several large brass manufacturing plants. Brass manufacturing requires large quantities of water. The nature of the valley is such that while there is a flood of water in the spring and at other times of freshet, the river is apt to be very low in summer. To have water stored up the stream is of great importance, and this was one of the prime purposes of the Mad River Company. A bill is now before the Legislature which, if it becomes a law, will give the company additional rights in Mad River by an extension of the charter. With the amended charter it is presumed that additional storage capacity of water will be provided. No official statement has been made to that effect. Another great importance of this reserve supply of water is to keep clean the Naugatuck River bed, which is polluted by sewage of the city of Waterbury.

New York.

NEW YORK, May 10, 1905.

Pig Iron.—There are some inquiries for moderate sized lots for prompt delivery, among them being one for a lot of 1000 tons for a pump company. An Eastern Pipe maker has purchased about 12,000 tons, and some of the Steel makers have taken considerable quantities of Basic Pig for forward delivery. Owing to the pressure from some of the Southern makers and some of the minor Northern producers, the markets have weakened. We quote as follows: Northern No. 1, at tidewater, $17.75 to $18.25; No. 2 Foundry, $17.25 to $17.50; $16.75 to $17 for No. 2 Plain, and $15.50 to $15.75 for Gray Forge. Alabama and Tennessee Iron are on the basis of $16.75 to $17 for No. 2 Foundry.

Steel.—Owing to the breakdown of the blooming mill, an Eastern Structural plant, has purchased during the past ten days about 10,000 tons of Steel Billets at private terms. It may be noted that during the past two weeks the leading interest has sold quite considerable quantities of Sheet and Tin Plate Bars for export for forward delivery.

Steel Rails.—The principal item of interest is the purchase by the Pennsylvania Company of 33,500 tons of Rails in addition to former purchases. It is understood that New England roads, too, have lately increased their orders by about 15,000 tons.

Finished Iron and Steel.—The outlook in the Structural trade continues very encouraging and some large contracts are coming up. During the past week the leading interest has taken small orders aggregating 12,000 tons. Quotations at tidewater are as follows: Beams, Channels, Angles and Zees, 1.74½c. to 1.84½c.; Tees, 1.79½c. to 1.89½c.; Bulbs, Angles and Deck Beams, 1.84½c. to 1.94½c.; Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine, 1.94½c. to 2.04¾c.; Fire Box, 1.94½c. to 2.50c., according to specifications; Refined Bar Iron, 1.74½c. to 1.84½c.; Soft Steel Bars, 1.64½c. to 1.74½c.

Old Material.—Business is practically at a standstill, due to the fact that dealers have been too free in their deliveries to the mills. Recent shipments of Steel Scrap to the mills have been far in excess of the present requirements and as a result great quantities of Old Material are on railroad sidings waiting to be taken from the cars. The railroads are so congested at the mills that embargoes have been declared. There are evidences of a desire upon the part of buyers of rolling mill Scrap to maintain rather stiffer prices so as to show less discrepancy between the prices of old and new materials. It is argued that the railroads are calling attention to the relatively low prices of Scrap which rolling mills are paying them as an argument against the high prices asked of them by the mills for new material. The only sales of importance reported are interesting because of the high figures at which they were consummated. One involved about 1000 tons of Pipe at $16.50 and the other included 1200 tons of No. 1 Machinery Cast at $15.25. Quotations per gross ton, New York and vicinity, are approximately as follows:

Old Iron Rails	$20.00 to $21.00
Old Steel Rails, rerolling lengths	15.00 to 16.00
Old Steel Rails, short pieces	14.50 to 15.00
Relaying Rails	20.00 to 21.00
Old Car Wheels	15.50 to 16.50
Old Iron Car Axles	21.50 to 22.50
Old Steel Car Axles	18.00 to 19.00
Heavy Melting Steel Scrap	14.50 to 15.00
No. 1 Railroad Wrought Scrap	18.50 to 19.50
No. 1 Yard Wrought Scrap	16.50 to 17.00
Iron Track Scrap	16.00 to 17.00
Wrought Pipe	13.00 to 14.00
Ordinary Light Iron	9.50 to 10.00
Cast Borings	8.00 to 8.50
Wrought Borings	11.50 to 12.00
No. 1 Machinery Cast	14.50 to 15.00
Stove Plate	12.00 to 12.50

The Amalgamated Scale.—(*By Telegraph.*)—The Amalgamated Association, in convention at Detroit, Mich., has adopted the 1903-1904 wage scale and will present it to the Conference Committee of the Republic Iron & Steel Company and other bar iron mills that sign the Amalgamated scale. The new scale calls for an advance ranging from 11 to 20 per cent. over the present scale, which expires on June 30. Under the present scale puddling on a 1.5 cent card is $5.37½, and under the new scale will be $5.75. It is probable that the manufacturers will oppose an increase in present rates of puddling and finishing, owing to recent decline in prices of bar iron and also because of the fact that lower rates of wages than called for in the new scale are paid by the nonunion mills. The first conference between Amalgamated officials and the Republic Iron & Steel Company will likely be held between May 20 and 25.

Panama Canal Machinery Found Available.

From an article by Frank G. Carpenter in the New York *Herald*, dated at Bas Matachin, Panama, we take the following interesting description of the work being done in rendering available for present use the machinery turned over by the French company:

Take a look at the biggest machine shop on the Isthmus of Panama. It is situated half way between the Atlantic and the Pacific, in the mountains, high up from the sea. It covers acres. Outside the shop the ground is covered with acres of car wheels, iron dredge buckets and steel rails. The warehouses near by contain more than $1,000,000 worth of pumps, dredges and machine tools, and the whole thing is like one of the great industrial institutions of Pittsburgh or Chicago, rather than a repair shop in the heart of the backwoods of the Isthmus of Panama.

Much Repair Work Being Done.

Bas Matachin is the chief shop for the work at Culebra. It is where the old French material is being made into new for use on the canal. There are other shops at Empire and there are also shops at Culebra itself, where the actual work of excavation is in progress. At Empire there are fully 15 acres of buildings and storage tracks, and there we have 50 locomotives, several hundred cranes and a vast number of dump cars. We have also big machine shops at Colon, on the Atlantic, and some at La Boca, on the Pacific.

We have a saw and planing mill running at Colon making the lumber for the new buildings and repairs, and there are tinsmith and blacksmith shops for the same purpose at Ancon, on the edge of Panama. Indeed, the man who thinks nothing is being done on the isthmus has but to see these shops to learn his mistake.

I am here at Bas Matachin with Carl A. Strom, the mechanical engineer of the Commission. He has charge of all the machinery of the isthmus, and it is his duty to keep it in repair. The Commission has told him to get what he can out of the French supplies, and he is doing this with a corps of mechanical engineers, American foremen and a large number of native laborers. He is a Swede by birth and was educated at the Royal Polytechnic Institute of Stockholm. After his graduation there he came to the United States and learned the English language while acting as engineer for the Chesapeake & Ohio & Southwestern Railway. He afterward became the mechanical engineer in chief of the Illinois Central.

"What kind of work are you doing?" I asked.

"Almost everything in the line of repairing," was the reply. "We have 300 men at work making general repairs on locomotives and car equipments and all kinds of other machinery used in the canal work. Our capacity just now is seven locomotives and 115 cars per month. We have already repaired about 1000 of the old French dump cars, and they are now in service at Culebra. Most of them were badly broken and rusted out. We renewed the timbers and replaced the missing parts. We repaired a number of locomotives and now have between 30 and 40 of them in use, and we have also been doing a great deal of fitting up of boilers, engines, concrete mixers and other things for the water works and sewer departments. We are repairing cranes, excavators, drills, dredges and all sorts of things."

Character of the Old Machinery.

"What is the character of the French machinery, Mr. Strom?" I asked.

"It is excellent of its kind, but much of it is now obsolete, having been supplanted by better inventions and by American improvements. When it was put here 20 years ago it was absolutely modern and the finest that could be purchased. As it is now much of it is good, and when it is sprinkled with additional tools from the States we shall have machine shops inferior to none.

"Take the French locomotives. Those which we are now repairing are of Belgian make. They are well designed and of superior workmanship, but they are complicated and in some ways hard to maintain. We can use them, however, and are repairing them for Culebra and other points. We are also repairing the old French excavators, which by an endless chain of buckets scoop up the earth and load it on the cars. These are now in use, and Chief Engineer Wallace will probably continue to use them until he has enough steam shovels or other superior American machinery to take their places. Just now when our machinery has not come from the States much of this old French stuff can be used. Indeed, it is hard to estimate the value of the material which we got with the canal. The equipment of the shops here is, I judge, worth at least $250,000."

"Can Americans work here in the tropics?"

"I think so, especially under cover, as in the shops. Bas Matachin is high and healthy. We have little sickness, and have had almost no malaria since the vegetation was cleared away. We want the very best American mechanics we can get, and I think they will eventually be satisfied with their pay and their accommodations."

French Extravagance.

Speaking of the old material, quite a lot of it has been used by the Sanitary Department in one way or another. The sanitary officers needed a launch, and it would have cost them $7000 had one been ordered from the States. They took an old boat at La Boca and by an expenditure of $320 fitted out a vessel which does very well.

Among the other valuable things left by the French is a great amount of stationery. They bought things by the ton, and this was so of fine drawing paper. In the basement of the administration building at Panama lies a carload or so of drawing sheets, each as big as a center table. The draftsmen tell me there is more than can be used for all the drawings that can possibly be made for the canal work and that the remainder will be worth thousands of dollars.

In the same basement there are printing presses and lithograph presses, all of which have been brought into use by the commission. The canal printers work night and day. They make all the blanks used in the work; they print all the reports, and upon the lithograph presses they are reproducing drawings and plans.

There are hundreds of letter presses scattered through the warehouses here, and there are also about six tons of steel pens, so rusty that they are good for nothing. Some of these have been shoveled out into the ocean, and the balance one of the builders facetiously says he intends to use for making steel concrete.

These six tons of pens give one an idea of the extravagant methods of the French. During the earlier years of the canal they bought everything in enormous quantities, and the belief is current that the clerks received a commission on their orders. Money flowed like water and purchases were carelessly made.

For instance, at one time a quantity of bolts and screws of a special pattern was needed. A model of wood was made to indicate the shape, and the wood was painted black to show that the screws were to be made of iron or steel. In issuing the order, however, no mention was made of the material. It was simply stated that the goods were to be according to sample. A few months later they came on, barrels and barrels of bolts and screws, made of wood painted black. They were according to sample and had to be paid for.

A. S. Mitchell is to take charge of the New York sales office of the Eastern Steel Company, and will handle the product in the metropolitan district. The new plant of the Eastern Steel Company at Pottsville will begin to make steel in June, and it is expected that rolling of beams up to 8 inches will begin early in July. The large structural mill now building will go into operation later.

The annual convention of the National Tin Workers' Protective Association convened in Wheeling, W. Va., on Tuesday, May 9. The organization is composed of tin house labor and will formulate a scale for this class of labor. It is probable that the association will ask for higher wages this year than called for in the old scale, which expires on June 30.

The Machinery Trade.

NEW YORK, May 10, 1905.

There has been no material change in the machinery trade during the past week, both orders and inquiries having come in in about the same volume and size as those of the previous week. Two more fair sized lists were received, and a couple of railroad companies, which it is expected will ask proposals for a round lot of machine tools, had representatives in the street getting a line on the tools they will probably secure. In some special lines of machinery business was a little more active. Mining companies are still purchasing large quantities of machinery and from the outlook the heavy demand for this class of equipment is likely to continue for some time to come, as there is a great amount of development work now being done.

Machinery and mill supply dealers are in a sanguine state of mind just now over the outlook for a good spring and summer business. Although the trade has been in a somewhat unsettled state, the recent convention of the Southern Supply and Machinery Dealers' Association, which was attended by dealers and manufacturers representing machinery interests in all parts of the country, had a particularly beneficial effect on the trade in general. The cordial relations which have existed of late between the manufacturers and dealers were materially strengthened by the formation of the manufacturers' association, and the dealers are under the impression that the organization was formed with the best of intention toward the interests of the dealers. The excellent reports of business conditions made at the convention renewed, or, rather, increased, the confidence of dealers hereabouts in the outlook for good business during the spring. While present business conditions among the machinery and mill supply men are by no means booming, inasmuch as there are no large orders actually being placed, there are enough large projects being talked of to assure the dealers that there will be considerable business later. Many of these propositions, at present "in the air," have approached a sufficient degree of certainty as to virtually assure merchants that business will not be slack in their lines, and those who are not as busy as they might be are contenting themselves with the assurance that the inquiries now in the market will mature into something definite within a short time. In the meantime the dealers are having a satisfactory pick-up trade and are keeping an eye open for better things.

At an executive session of the Rapid Transit Commission last week it was decided to have a four-track subway in Thirty-fourth street from Third to Eighth avenue. This action of the commission places Thirty-fourth street in the hands of the Metropolitan-Pennsylvania interests, which want the route because it will give the best possible connection between the proposed subways of the Metropolitan system and the Pennsylvania Railroad station.

Large Railroad Requirements.

One of the most important happenings in the machine tool trade was the receipt of a list of tools required by the New York Central & Hudson River Railroad. The specifications are of fair proportions and cover miscellaneous tools to be installed in the company's various shops.

The demand for machine tools and equipment for shop use by the Pennsylvania Railroad Company continues unabated, and the list of its requirements is growing each week. At the present time estimates are being received on machine and erecting shops with blacksmith shop attached, same as McKees Rocks shops of the Philadelphia & Lake Erie Railroad, and for these shops inquiries are being made for a total of 19 cranes with which to equip the plant. Altogether it is estimated that the plant will cost over $1,500,000. The following list of tools and machinery is a continuation of the 1905 programme of the Pennsylvania Railroad Division: One special feed water heater and receiver, one automatic machine for tapping and facing ½ to ⅞ inch cold punched nuts, two water tube boilers, one No. 2 combination cold saw cutting off machine, motor driven; one 42-inch wheel boring mill, to be motor driven, alternating current; one 36-inch improved triple geared standard engine lathe, 10 feet long between centers; one special railroad pneumatic punch, No. 2; one 20-inch screw cutting engine lathe, one annealing and flanging furnace, one 12-inch outside molding machine, complete; one motor driven hydraulic pressure pump, with direct connected motor; one cutter and reamer grinder, with countershaft and complete equipment for sharpening milling cutters of all kinds; two duplex boiler feed pumps, pressure pattern; one electro magnet, to be operated on 220 volts direct current; three cross compound two stage air compressors, to operate noncondensing on 150 pounds of steam, low pressure air cylinder to be 30 inches in diameter; one multiple spindle automatic turret machine, fitted with a complete set of tools; one jointer, complete with countershaft and one set of knives; one 30-inch 30-ton power forcing press, complete with gauge, &c.; one four-spindle and one six-spindle angle cock grinding machine; one 120-ton 65-foot span electric traveling crane, 40-foot hoist; one 12½-ton 62-foot span electric traveling crane, 29-foot hoist; three 12½-ton 46-foot 3-inch span electric traveling crane, having 21-foot hoist; three 25-ton 77-foot span electric traveling cranes, 30-foot hoist; one 50-ton 77-foot span electric traveling crane, 30-foot hoist; one 12½-ton 73-foot span electric traveling crane, 30-foot hoist; one 12½-ton crane, 77-foot span, for use on a crane runway outside of shop buildings; two 40-ton electric traveling cranes, 96-foot span, 30-foot hoist; one 12½-ton 96-foot span electric traveling crane, 30-foot hoist; one 12½-ton 60-foot span electric traveling crane, 30-foot hoist; four 5-ton electric wall traveling jib cranes, 20-foot hoist and effective radius of 20 feet; one improved 18-inch crank shaper; one 96-inch 400-ton wheel press, to be fitted for raising and lowering and to be motor driven; one turret head bolt cutter, complete; one outside end packed, duplex, pot valve pattern boiler feed pump; one 350 horse-power, open type, feed water heater and purifier.

The Brooklyn Rapid Transit Company, which is to erect large repair shops at its East New York yards, at Jamaica avenue, Fulton street and Broadway, Brooklyn, is now considering the mechanical equipment. A representative of the company is understood to have visited the street during the past week and to have looked over the various makes of machine tools, for the purpose of securing data that will aid in making up the list of tools necessary to equip its new shops.

Another Brooklyn improvement which the trade is following closely is the proposed new freight terminal to be constructed at Bay Ridge by the Long Island Railroad Company. The railroad is planning to spend about $1,500,000 at that point and it is generally understood that considerable mechanical equipment will be required in carrying out the project.

Quite a quantity of new machinery is required by the Detroit Southern Railroad Company for equipping its new shops at Jackson, Ohio. In addition to the machinery which it will take from its Springfield shops, the company will purchase a 125 horse-power stationary engine, one 10 x 14 inch air compressor, three 125 horse-power internal fired boilers, one 750-pound steam hammer, one 12-inch flanging plant, one 18-inch swing screw cutting engine lathe, one 16-inch swing screw cutting engine lathe, one 26-inch swing screw cutting engine lathe, one double head axle lathe, one double head driving wheel tire lathe with quartering and crank pin boring attachments, one universal radial drill, two 26-inch upright drills, one 28-inch upright drill, one No. 2 hollow hexagon turret lathe, one double head bolt cutter, one pneumatic flue welding machine, one pipe bending machine, two crank shapers, extreme length of stock 20½ inches; one expansion boring bar, and several air hoists, air hammers, drills and other small tools. J. C. Homer is superintendent of motive power and equipment, with headquarters in Springfield.

Machine Tool List for New Hoffman Engine Plant.

The Hoffman rotary engine is now being placed on a substantial commercial basis, having emerged successfully from the exhaustive experimental stage, and companies are being formed in various localities to build the engine on a royalty basis. The Hoffman Rotary Engine Company, Portland, Ore., has recently been organized with a capital stock of $500,000 for the purpose of supplying the trade on the Pacific Coast. Another company is now in process of organization in Canada to be known as the Hoffman Rotary Engine Company of Canada. It will be incorporated with a paid in capital stock of $1,000,000 under an Ontario limited charter, which permits the increase of capital from time to time as required. As a nucleus of its proposed new plant a large steel mill at Belleville, Ont., has been purchased by the new company, and estimates are now being secured from American machine tool builders for the necessary machine shop equipment. This equipment is for the first installation for the plant and is only a small portion of what is intended to install in the near future. The plans of the company are to spend $100,000 for machinery equipment. The tools which are to be purchased at present are as follows:

Three 6-foot radial drills with 4 and 3 foot arms; four back geared drill presses from 36 down to 18 inch, three high speed drill presses, one large and one medium sized milling machine of the most approved type, two boring mills with 7 and 4 feet swing respectively, two 15 and 24 inch slotting machines, one 15, one 20 and one 24 inch shaper, three 24, 48 and 72 inch planers, lengths of bed undecided; four 18, four 24, two 36 and one 48 inch screw cutting lathes of the most modern type. W. M. Hoffman, the inventor of the engine, is now in the city obtaining estimates from machinery dealers. He will leave to-morrow for Belleville, Ont., with a party of capitalists, headed by Sir C. R. Wilson, president of the Grand Trunk Railroad. Mr. Hoffman will not close for the machinery until next week, when he returns from Canada to his Buffalo office, which is located at 51 Letchworth street. Mr. Hoffman is general manager of the General Engine Company, Buffalo, N. Y., which operates only a laboratory plant and acts as the parent comany in the matter of forming subsidiary companies for building the engine in various parts of the globe.

To Double Air Compressor Plant.

In consequence of the activity displayed in certain branches of machinery the demand for air compressors has so largely increased with the Chicago Pneumatic Tool Company, New York and Chicago, that it is unable with its present facilities to take care of the orders it is receiving for these machines. To provide for this increased business the company has decided to double the capacity of its plant in Franklin, Pa., by the erection of new buildings and the installation of a large amount of additional equipment. The specifications for the machine tools have not yet been made up in detail, but it is known that the requirements will be large for equipping such extensive additions, and before very long the trade can look for a nice fat list of tools to bid on. There are to be three new buildings erected, plans for which are not yet completed. The main building will be about 150 x 200 feet, and there will be an important extension to the foundry. For the power plant additional boilers will be purchased.

The Canada Car Company, Limited, Montreal, Canada, has completed purchases of about all the machinery it will require for equipping its new plant at St. Henri, the details of which were noted in these columns some time ago. Though most all of the machinery was bought from Canadian companies, it was to a great extent made in this country.

Orders were placed with the Canadian Fairbanks Company, Montreal, for one American Tool Works engine lathe, three Niles axle lathes No. 2, one Gould & Eberhardt 24-inch shaper, one Pond 42-inch coach wheel lathe, one Brown & Sharpe No. 4 universal milling machine, one 51-inch Niles boring mill, one Pond 150-ton wheel press, two Bement 24-inch vertical drilling machines, two Bement 32-inch vertical drilling machines, one Bement, Miles & Co. 2000-pound double frame steam hammer, one Bement, Miles & Co. 800-pound single frame steam hammer, one Bement, Miles & Co. 350-pound single frame steam hammer, one Wilmarth & Morman stye F new Yankee twist drill grinder, one figure 792 Clement No. 1 single surfacer and smoothing planer, one American Wood Working Machinery Company four-sided molder, two S. A. Woods Company No. 325 horizontal four-spindle car boring machines, two American No. 2 vertical boring machines, one American horizontal hollow chisel mortiser, one American improved scroll saw, one Oliver Universal saw bench, two American No. 2 self feed rip saw tables, three Oliver patent wood trimmers, one Whitney patent wood scraping machine, one S. A. Woods vertical hollow chisel mortiser, one Baldwin, Tuthill & Bolten improved automatic band saw filer, one S. A. Woods new automatic knife grinder, one Merrill Mfg. Company pipe cutting and threading machine, two standard Wieland pipe threading and cutting machines, two Ransom Mfg. Company water tool grinders, one S. A. Woods three-spindle vertical borer.

Williams & Wilson, Montreal, two Foote, Burt & Co., standard six-spindle arch bar drills; one Bradley 100-pound helve hammer, two Beaudry, 100-pound, No. 4 Champion power hammers; one Hamilton Machine Tool Company's No. 3 grindstone frame and stone, one Hamilton Machine Tool Company's No. 2 grindstone frame and stone, three Diamond Machine Company's No. C standard grinding machines, one Diamond Machine Company's No. B standard grinding machine, two Berlin Machine Company's Invincible planer No. 41, one Berlin No. 153 Invincible finishing planer, two McGregor & Gourlay Q. Y. planer and matching machines, one Greenlee sash relishing and mortising machine, one Berlin Invincible No. 203 heavy shaper table, one MacGregor & Gourlay Q. G. tenoning machine, three Greenlee six-spindle vertical boring machines, two Greenlee three-spindle medium heavy vertical boring machines, one Greenlee No. 3 extra range automatic car gaining machine, one Greenlee No. 4 extra heavy vertical automatic car sill and tenoning machine, one Greenlee automatic double end car tenoner, one Greenlee No. 6 C heavy horizontal automatic hollow chisel mortising machine, two MacGregor & Gourlay U. N. band saws, one MacGregor & Gourlay U. W. dimension saw table, two MacGregor & Gourlay U. Y. improved swing cut off saws, one Greenlee No. 3 vertical automatic cut off saw and grainer, one Greenlee automatic car brace cutting machine, one MacGregor & Gourlay W. J. double rip and cross cut saw, one MacGregor & Gourlay No. 3 single end wood lathe, one MacGregor & Gourlay double end 20-inch wood lathe, one Berlin 'Royal Invincible" sand papering machine, one automatic circular saw sharpener, one MacGregor & Gourlay seven-head grainer.

John Bertram & Sons, Dundas, Ont., one Bertram single belt high speed lathe, one Bertram standard iron planing machine, one Bertram single frame slotting machine, one Bertram full universal radial drill, one Acme six-spindle nut tapping machine, two Acme six-spindle back geared nut tapping machines, five Acme triple head bolt cutters eight bolt heading upsetting and forging machines one Acme bolt pointing machine, four Bertram car wheel boring machines, one triple geared engine lathe, two Bertram independent feed drills, three No. 2 Niles axle lathes.

Peacock Brothers, Montreal, one No. 2 hand planer and jointer, one No. 32 iron frame dimension planing machine, two No. 107 lightning flooring machines, two No. 4 universal wood workers, one No. 93 sash mortising and relishing machine, one No. 3 new four-side patent molding machine, one panel carving machine and friezer, one No. 52 universal vertical, horizontal and radial borer; one No. 4 vertical hollow chisel car mortising machine, one No. 4 car tenoning machine, one No. 109 band ripping saw, one No. 3 large size patent automatic railway cutting off saw, three No. 2 patent automatic railway cutting off saws, one No. 1 patent automatic band rip saw, one No. 146 improved band rip and resawing machine, all of Fay & Eagan make.

Williams, White & Co., Moline, Ill., one double gear open fronted bar shear, one single punch and shear, two double punches and shears, one horizontal punch 12-inch throat, one forging roll, three bulldozers, one eye bender.

Manning, Maxwell & Moore, New York, two Putnam No. 3 axle lathes.

Ajax Mfg. Company, Cleveland, Ohio, one Ajax ten-spindle brake pin drill, one Ajax ½-inch hot pressed nut machine.

The Trenton Brass Foundry & Machine Company is erecting an addition to its plant at Trenton, N. J., 40 x 300 feet, and a power plant, the horse-power of which has not been decided upon. Th extension will be a general one and later on the company will probably require lathes, brass finishing machinery and power plant equipment.

The Utah Copper Company will not be ready to order the machinery for its new 3000-ton smelter near Salt Lake City, Utah, for some 60 or 90 days, as it will take that length of time to complete the plans and specifications which the company is now at work on. D. C. Jackling is general manager, with headquarters at Salt Lake City.

The Krajewski & Pesant Company, 32 Broadway, New York, has secured a contract for a complete sugar plant for the Niquero Sugar Company, to be constructed at Niquero plantation, in Cuba. The plant will consist of a nine-roller mill, Krajewski crusher, evaporating apparatus and a quantity of other machinery. The company also has contracts for a six-roller mill and crusher for Sotero Escarza, as well as for 12 more crushers for Cuba and Porto Rico. The company, which builds most of the machinery itself, is constructing a new erecting shop at its Erie Basin Iron Works in Brooklyn. Practically all of the machinery has been arranged for. The New Jersey Boiler Company, 95 Liberty street, New York, has the contract for the steel cane shed and crusher house for the Niquero plant and for the erecting shop in Brooklyn.

Important Power Projects.

A project which is said to have reached more than the speculative stage and which will entail the purchasing of a large amount of machinery is that of the Delaware & Hudson Canal Company, 21 Cortland street, New York, to construct four 10,000 horse-power electric plants in the vicinity of Scranton, Pa. It is known that for some time past the company, which owns extensive coal mines in that section, has had under contemplation a scheme to establish central power stations to furnish power to operate its mines electrically. The culmination of the plan will entail the purchasing of a large quantity of electrical and power machinery, the specifications for which have not yet been prepared.

About 800 horse-power of boilers will be purchased for the Baltimore & Ohio Railroad Company's central office building, under construction at Baltimore, Md. Power for the structure will be obtained from an adjacent power plant owned by the railroad company, but in addition to the boilers, motors will be bought, as well as all other adjuncts of a complete heating system. The building will be 155 x 168 feet, and 13 stories high.

The engineering firm of Sanderson & Porter, with offices at 52 William street, New York, is constructing a large central power station and boiler house for the New Orleans Railroad Company. The station when completed will be the largest in New Orleans, and will have an ultimate capacity of 60,000 horse-power. The boiler house will be 115 x 250 feet, while the engine room will be 93 x 250. It is proposed to install three 500-kw. units and later on units of a larger size will be added. It is expected that the new power house will be put in operation next fall and the major portion of the machinery equipment has been arranged for.

Extensive purchases of machinery are being made by Albert A. Cary, 95 Liberty street, New York, for the Tennessee Copper Company, which is installing a new power plant and an extension to its smelter at Copper Hill, Tenn. The power plant is to be of 2000 horse-power. All bids are in and contracts have been given out for all the equipment excepting the coal and ash handling machinery. No arrangements have been made as yet for the piping, of which there will be some extensive purchases.

Business Changes.

The United Engineering & Contracting Company has moved its general offices from the Park Row Building to 32 East Thirty-third street, New York.

A. P. Head, the London representative of the Wellman-Seaver-Morgan Company, who has completed a tour around the world, has established the following sub agencies for the company: Melbourne, Australian Metal Company, as Australian agents, which has branches as follows: New Zealand. the Gilbert Machinery Company, Wellington; Queensland.

James Stothert, Brisbane; New Queensland, James Croket, Mackay; New South Wales, W. R. Laidley, Sydney; South Australia, James C. Fraser, Adelaide; West Australia, A. E. Thomas, Koolgardie; Tasmania, Lindsay Tullock, Launceton. In India the following agents representing the presidencies of Bombay, Bengal and Madras have been appointed: J. Harper, Calcutta; Frank Harrison, Bombay; W. H. Oakes, Madras.

New England Machinery Market.

WORCESTER, MASS., May 9, 1904.

A trip among the smaller manufacturers of machine tools in Connecticut reveals a most satisfactory condition of business. They are very busy—so busy, in fact, that regret is expressed in some cases that facilities for manufacturing are not greater. A little more money for new building and equipment and for working capital would mean a good deal at this time for these shops. But as it is, they are doing well, running their plants to their fullest capacity.

In the general situation in New England there is a suggestion of the intermittent. The influence of the recent depression is still felt. It is not so much the volume of business in hand that gives to some of the machine tool men their idea of the condition of business, but the number of inquiries and orders received. If these are sufficiently numerous the manufacturer is satisfied that the outlook is good. If there is a let up extending through his mail for several days he develops pessimism. In this he shows the effect of the long period of waiting, of inquiries without orders. These instances are rather the exception, but they have their influence on the general feeling. It is probable that only a genuine, abnormal boom would satisfy every one. The fact remains that all branches of business in New England are very busy and the machine tool manufacturers are getting a pretty good share of the general prosperity.

The Dartmouth Mfg. Corporation, New Bedford, Mass., cotton manufacturer, is to make large additions to its mills, including a three-story weave shed and a five-story building, both of brick and steel, the approximate ground area to be 100,000 square feet. The question of new power facilities has not been settled, the amount of necessary increase not having been ascertained.

The Stanley Electric Mfg. Company, Pittsfield, Mass., and the General Incandescent Arc Light Company, New York, constituent parts of the General Electric Company, have been consolidated, the new company to be known as the Stanley-Incandescent Electric Mfg. Company. The works of the united company will be at Pittsfield. There has been talk of this consolidation for some months, and it was reported recently that the plan had been abandoned.

The Atlantic Works, East Boston, Mass., which does a large general machine and boiler business, including important marine work, is to erect a four-story brick building, 40 x 175 feet, to be used principally for pattern making and pattern storage. The company states that it will need no new machinery, but will remove equipment from the present shop.

Avery F. Keith, Onset, Mass., wishes prices on new and second-hand 8-inch buzz planers. He has added to his shop where he does a general repair business.

Andrew J. Campbell, secretary and superintendent of the E. J. Manville Machine Company, Waterbury, Conn., has sailed for Europe on a short trip, which will combine business and pleasure.

The Hockanum Woolen Company, Rockville, Conn., is to erect a four-story brick mill, 55 x 175 feet, to replace a smaller wooden building. The power plant will be slightly changed.

The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., has acquired a controlling interest in the Waterbury Machine Company of that city, manufacturer of wire machinery, eyelet machinery and special machinery. The change in ownership will mean no change in the policy of the management. R. S. Wotkyns will remain the treasurer, and William D. Pierson the secretary. John H. O'Donnell will continue his duties as wire machinery expert and salesman. The Waterbury Machine Company is capitalized for $60,000. Two years ago large additions were made to its plant.

The William Allen Sons Company, Worcester, Mass., manufacturer of boilers, has increased its capital stock from $20,000 to $25,000, and the number of officers has been increased by the addition of Herbert M. Dodge, Boston, formerly in the iron business in that city. Mr. Dodge will be vice-president and will have charge of the business end of the management. William G. Allen will be the company's mechanical engineer. William Allen is the president and Walter B. Allen treasurer. The old foundry of the company has been dismantled and converted into a boiler repair shop, especially for locomotive work. The company reports that business warrants the immediate doubling of the present working force. A specialty will be made of a patent kier and the Allen radial boiler, the invention of William G. Allen.

The American Tap & Die Company, Greenfield, Mass., is to erect a new factory in that town. The building will be of brick, 50 x 100 feet, and two stories. The work will begin as soon as possible, as the present plant has been outgrown. This is one of the latest additions to the tap and die industry of Greenfield, the company having been formed about three years ago. Electric power will be used, obtained from the local electric company. The company will be in the market for tools for the new building later on.

The Concord Electric Company, Concord, N. H., will increase its water power plant to the amount of about 1800 horse-power, developed into electricity through two 500-kw. generators. The equipment will consists of two units, each having a water wheel of 900 horse-power direct connected to one of the generators. The increase involves extending the company's power house and enlarging the canal and tail-race.

The executive offices of the Pope Mfg. Company are now located at Hartford, Conn., having been removed to that city from New York. This is a source of much gratification to Hartford, for the company has a capital stock of $22,500,000, with factories located in various parts of the country. The company owns and controls the Pope Motor Car Company, which has two branches—at Toledo, Ohio, where the Pope Toledo touring car is built, and the factory at Indianapolis, Ind., where the Pope Waverly electrics, in 15 different models, are manufactured. At Hartford the Pope-Hartford gasoline touring car is built and at Hagerstown, Md., the Pope-Tribune runabout and light touring car.

The business of Edward K. Lombard, manufacturer of wool carding machinery, Worcester, Mass., has been taken over by a new corporation known as the Lombard Machine Company. J. J. Wehinger will be the manager of the business.

Chicago Machinery Market.

CHICAGO, ILL., May 9, 1905.

The spread of the teamsters' strike to a wider and wider local field and the consequent embarrassment of firms who have come under the ban of the teamsters' displeasure have had an unfavorable influence on the market for machinery and supplies. Another unfavorable omen is the threatened general strike of machinists. For nearly a year a strike has been nominally in force against firms that are members of the Chicago Metal Trades Association, though shops are running full with nonunion men. In order to stem the tide of the open shop movement officers of the International Machinists' Union are quoted as having decided to call a general strike unless certain closed shops' demands are granted. Whether this threat will come to anything or not, it is not doing the machinery business any good.

A good trade is reported by makers of gas engines and producer systems, particularly in fairly large units. A vast number of small motors is being bought, but there are so many firms competing for this business that the share of each is not so great as to embarrass the manufacturing departments. Machine tools are, if anything, a little quieter than last week, for reasons above outlined. Boiler shops for the most part are busy on repair, tank and stock work, while the large boiler manufactories report a heavy trade.

The Troy Laundry Machinery Company, Chicago, a prominent builder of laundry machinery, is erecting a large plant at Twenty-third and La Salle streets. This will comprise a five-story building, 125 x 265 feet, costing, approximately, $200,000. Contracts for construction and equipment have already been let. General contract has been let to the Falkenau Construction Company, Chicago. The power plant consists of three 200 horse-power horizontal tubular boilers, built by Kroeschell Bros. Company, Chicago, supplying steam at 125 pounds pressure, equipped with automatic stokers; three automatic engines, aggregating 440 horse-power, furnished by the Ames Iron Works, Oswego, N. Y., through E. W. Ritter, its Chicago representative, the engines being direct coupled to two 125-kw. 125-volt generators for power and one 30-kw. generator for light. Electric motors aggregating about 350 horse-power, ranging in size from ½ to 30 horse-power, were purchased from the National Electric Company, Milwaukee. The larger machines will be driven direct and the smaller in groups of five or more. The vacuum steam heating system will be installed and the plumbing work will be done by the Hanley-Casey Company, Chicago. Only minor purchases were made of machine tools, as the principal equipment will be removed from the old quarters on Fifth avenue, but of the tools purchased the lathes and planers will be furnished by the Jones & Lamson Machine Company, Springfield, Vt. It is expected to have the plant ready for occupancy June 1. The site affords excellent railroad facilities, being adjacent to all roads entering the La Salle street station.

The Butler Street Foundry Company, Butler and Thirty-fifth streets, Chicago, is adding a structural steel department to its business. The new building is 61 x 130 feet long, one story in hight, equipped with a 5-ton electric traveling crane, furnished by the Northern Engineering Works, Detroit, and with punches, shears and other tools for working

in structural iron. The new building will be ready for occupancy in about one month.

The Campbell Furnace Company, Des Moines, Iowa, has had plans completed for new factory buildings. It is expected that additional machinery will be needed for the equipment of this plant, though such purchases will not be made before November.

The Minneapolis Steel & Machinery Company, Minneapolis, Minn., has added gas engines and producers to its line of Corliss engines and other machinery. It has made arrangements with the G. Luther Company of Braunschweig, Germany, by which it has the sole right to manufacture and sell in the United States the Munzel gas producer, an invention of Max Munzel, who is the general manager of the German firm.

The Oceana Electric Light & Power Company, B. C. Lindley, president, Pentwater, Mich., is having plans prepared and will take bids about May 15 for one 300-kw. and one 200-kw., three-phase, 60-cycle alternator stepped up to 25,000 volts, complete and of the best type. It is the purpose of this company to build a 300-foot timber dam across the Pere Marquette River and to develop 700 horsepower under a 28-foot head.

The Abendroth & Root Mfg. Company, maker of spiral pipe, water tube boilers, &c., announces the removal of its Chicago offices from 710 Fisher Building to 410 Monadnock Block. Allan F. McIntyre is Western manager of the company.

The Fort Dearborn Mfg. Company, Chicago, manufacturer of metal specialties and machinery, has just moved from 58 North Jefferson street to its new plant at Clybourn Junction, Chicago.

The Laredo Mining & Smelting Company, Laredo, Texas, organized with a capital stock of $250,000, contemplates opening up its mines of copper, lead, silver, zinc, iron and coal on the Sierra Madre Oriental, southeast of Monterey, in the State of Nuevo Leon, Mexico, and will probably need mining tools, machinery for smelting, concentrating and other mining purposes. The officers of the company are C. G. Brewster, president; W. H. Mims, secretary; C. C. Pierce, general attorney, all of Laredo.

The Prescott Company, manufacturer of special machinery, Menominee, Mich., has decided to install a steel casting foundry in connection with its present plant. Decision has not yet been reached whether to use the Tropenas or the open hearth system. The foundry will have a capacity of about 10 tons a day, and as soon as plans are ready for its construction will be pushed rapidly to completion. The company will need complete equipment, including generator, motors, electric crane, and all necessary machinery required for a modern foundry.

The Sewerage and Water Board of New Orleans, La., awarded contracts to the United States Cast Iron Pipe & Foundry Company of Chattanooga for furnishing cast iron pipe and special castings, amounting to $160,550 and $148,809. From time to time the board will let similar contracts for cast iron pipe, as there are some 400 miles of water pipes and mains to be laid in the water works system which the board has now in process of construction.

Two of the largest, if not the two largest, municipal pumping engine contracts ever placed have been awarded to the Allis-Chalmers Company, Milwaukee, one for $500,000 by the city of New Orleans, and one for $350,000 by the city of Pittsburgh. The New Orleans order includes three cross compound Reynolds-Corliss engines, direct connected to centrifugal pumps of 40,000,000 gallons capacity per day each, and four big pumping engines, each of 30,000,000 gallons per day capacity. The four will be of the vertical triple expansion crank and fly wheel type. There will also be supplied one 20,000,000-gallon centrifugal pump and one horizontal cross compound Reynolds-Corliss engine, as well as a 150-kw. Bullock generator, direct connected to a horizontal cross compound Reynolds-Corliss engine. The Pittsburgh Pumping Station will be supplied with two vertical compound crank and fly wheel pumping engines, capable of pumping 30,000,000 gallons of water daily against a head of 360 feet. This station will also be supplied with four centrifugal direct connected pumping units, each pump to have a capacity of 35,000,000 gallons of water per day against a 45-foot head.

The Cross Press & Sign Company, Chicago, will shortly build a new four-story factory, 100 x 176 feet, adjoining its present plant at Dayton and Blackhawk streets. Power for the wood working machinery in the basement of the new structure will be secured through a line shaft from the power plant of the old factory, while machinery in the upper floors of the building will be operated by motors. The firm will for the present, therefore, require no increase in engine capacity, but will require an additional boiler and a number of motors.

The Springfield Boiler & Mfg. Company, Springfield, Ill., which suffered a disastrous fire last Wednesday, will immediately rebuild, replacing the burned structure with a modern steel shop. The power plant also was destroyed and new engines will be required, though the company has on hand sufficient boilers for its own capacity. Most of the heavier hydraulic machine tools were but little injured, and it is not definitely known at the present time what machinery requirements will be necessary to fit out the new plant.

Cincinnati Machinery Market.

CINCINNATI, OHIO, May 8, 1905.

The past week in machinery circles has shown no important developments and a fairly active trade is still apparent. There seems to be a disposition among some of the tool builders to compare the amount of business being done in shops that have been in many instances doubled with that of a few years ago, when the facilities for handling their output was very appreciably less than at present. At that time many concerns found expansion imperative in order to accommodate the increased volume of business that came pouring in upon them. Now, when matters have assumed a more normal tone and the spasmodic action is apparently over, it is difficult for them to adjust the workings of their shops to the altered condition of affairs and at the same time feel that they are receiving a fair and satisfactory proportion of the trade that is offering. This, however, does not apply to all the plants in the city, as we know of several cases where to-day they are adding floor space to their already large shops.

The general jobbing foundry trade still continues very quiet and the condition locally is far from satisfactory. As was announced in our letter of last week, the Iron League has issued its ultimatum to the structural workers and has positively refused to hold any more conferences with them in reference to the new schedule of prices. This has had the effect of causing a number of the shop workers to return to their old positions, and will no doubt prove effectual in causing the outside men to fall into line.

We learn that during the week one of the large lathe manufacturers has been the recipient of another large order destined for the Japanese Government, which will keep the plant busy into the summer months. The lathe industry is probably busier than any other particular line of tool building, although there seems to be a growing demand for milling machines, drills and other tools.

A. Streit Machine Company says that business with it is better than it has been at any time during the past 16 months. It manufactures pulley lathes and a large amount of its business hinges on the condition of power transmission demand. The company says that foreign trade is showing signs of improvements, especially with Germany. It has recently added to the list of its manufactures gasoline engines for automobiles. These it makes in 16 horse-power opposed and four-cylinder vertical 25 horse-power. At the present time it is selling more than it can build. It is redesigning the 16 horse-power motor. A 22-inch Hamilton machine tool lathe has been added to the equipment and it expects to be in the market for several more new tools before very long. It also builds boring machines and pulley tapping machines.

In our letter last week we referred to the fact that Frank Johannigmann had purchased an interest in the J. M. Robinson Mfg. Company and would continue under the same name. Since then we learn that the company is erecting a building on Spring Grove avenue, south of Sassafras street, which will be 60 feet front by 200 feet deep, two stories high in front and of brick construction. This we understand is to be the new home of the J. M. Robinson Company when completed and will give ample room for handling heavy machinery. We are unable to positively state as to the needs of the concern as to new tools, but presume that it will of necessity be compelled to add to its equipment.

The Watkins Laundry Machinery Company, located on Spring Grove avenue, says that it is running nights until 9 o'clock, in order to take care of orders. It has recently added to its equipment a lathe, two drills and a milling machine. It is now in the market for more lathes and other tools.

The Rahn-Mayer-Carpenter Company reports that it has no stock and cannot make any, as it is disposing of its tools as rapidly as it can make them. It has been rearranging its tools and has added several turret lathes and gear cutters complete. It has increased its working force about 10 per cent., and will further increase it within the next month. It is a builder of 16 to 32 inch engine, turret, gap and pan lathes. Foreign trade, especially with England and Belgium, is reported as active.

Smith & Mills advise that they are very busy, and that trade from abroad is exceedingly promising. They have ready for shipment two medium size shapers and orders for five others for Yokahama, Japan.

The R. K. LeBlond Machine Tool Company says that foreign business is growing better every day. France, England, Holland and Belgium are especially active and are contributing largely. Another order in the line of milling machines and lathes has come from Japan, and it is now engaged in filling this order.

The J. A. Fay & Egan Company's new addition is now under way, and is being pushed forward to completion. This building will be 80 x 100 feet and five stories high, and will contain about 40,000 square feet of floor space. It will contain a massive elevator capable of lifting 12 tons, and will

probably be equipped with traveling cranes. It is to be used for warehouse purposes, and when so utilized will necessitate the rearranging of the present equipment, and possibly make it necessary to purchase new tools.

Chris, Wais, formerly with the Wais-King Tool Company, has located at the southeast corner of Pearl and Plum streets, where he will manufacture a special boiler makers' drill with oval chuck attachment. He has installed his equipment and will begin operation this week.

The Detroit Copper & Brass Rolling Mills, with mills at Detroit and Chicago, has opened an office in this city, at room 504, Mercantile Library Building, with F. W. Farnsworth in charge.

The Cincinnati Milling Machine Company reports an unprecedented trade with a general distribution of orders throughout the country. Foreign inquiry is also a very important factor and has been quite heavy. The addition to the plant is progressing satisfactorily.

The Cincinnati Machine Tool Company has had a very satisfactory week, and while there have been no very large orders added to the books during this time, trade has been normal and of good, healthy growth.

Articles of incorporation of the Central Pig Iron Warehouse Company were filed in the County Clerk's office one day last week. The stockholders are Rogers, Brown & Co., H. E. Turner, F. H. Miller and H. H. Leonard. The company will maintain storage yards for pig iron in Erlanger and Newport.

The Cincinnati Galvanizing Company has been incorporated with $20,000 capital by Christian Schott and others.

Philadelphia Machinery Market.

PHILADELPHIA, PA., May 9, 1905.

There has been but little change in the conditions in the local market. The past week has been fairly productive in the matter of orders, both for machinery and tools, and while individual specifications have not been large, the aggregate volume, made up of a number of small transactions, has been quite extensive. There seems to be almost an entire absence of specifications for heavy individual business, such as the equipment of any one large plant, almost all the recent inquiries having been rather in the nature of a few tools here and there, either for replacement or for small extensions to present plants. Railway specifications are coming out more freely, but the requirements are not large, however, and orders have been well distributed. The greatest demand recently has been in the direction of the heavier tools, such as radial drills, lathes, planers, &c. Inquiry for the smaller machine tools continues light except for small drills, which have been in more active demand during the past week.

Manufacturers continue on the whole quite busy. Heavy tool builders have a good volume of orders on their books and deliveries in some instances are considerably extended. The smaller plants are receiving a fair day to day business, and while most of them could handle a greater quantity of work, there is no complaint as to present nor anxiety as to future conditions. Dealers' floors, which have recently been rather bare of tools, are filling up to some extent. Tools which have been on order for several months are being delivered by manufacturers, and in instances dealers will now be able to ship immediately direct from their floors. Present day buyers have been rather inclined to want spot shipments and in a number of cases recently delivery has governed the sale. With good stocks on machinery floors dealers will be better able to take care of this trade, a condition, however, which has until now been hard to get and which even now only exists to a limited extent.

The demand for boilers and engines does not seem to improve as rapidly as dealers and builders would like. There is some good business on the market and more is in prospect, but matters appear to be slow in coming to any definite conclusion.

Locomotive builders, crane shops and builders of heavy engines continue quite busy, and have orders booked sufficient to keep their plants operating at full capacity for a number of months.

The United Gas Improvement Company will build an extension to its Point Breeze plant, in this city. A new building, 49 x 54 feet, of structural iron, with corrugated iron covering, is to be started at once. The estimated cost of the improvement contemplated at the time is about $35,000.

The Philadelphia, Baltimore & Washington Railroad Company has purchased property 41 x 100 feet adjoining its yards at Sixteenth and Washington avenue. This will be added to its present yard facilities at the above point.

The Carver File Company is making rapid headway with its new plant, the building of which has been previously referred to in these columns. It is now ready to place orders for machinery and tools; its requirements include a steam driven air compressor, capable of compressing 300 feet of free air per minute, under 50 pounds steam pressure; a 5½ x 3½ x 5 steam pump for boiler feed, a 3½ x 4½ belt driven pump and a 200 horse-power feed water heater. The machine shop equipment will include a 25-inch lathe, 12-foot bed; a 14-inch shaper, a 16-inch shaper, universal milling machine, 3-foot radial drill, 20-inch drill press, power hack saw, grinders, vises, &c. Bids for tools and machinery will be received by David Halstead, engineer, 334 Land Title Building, Philadelphia, and must be received prior to May 18, when contracts are expected to be let.

Frank Toomey, 127 North Third street, is in the market for a 14 x 36 or a 16 x 36 right hand Corliss engine, 125 horse-power; a second-hand engine is preferred. This party has recently purchased the complete boiler installation of a cotton manufacturing plant, consisting of 15 150 to 175 horse-power Manning vertical boilers, working under 135 pounds steam, as well as several other complete installations of machinery.

The Keystone Lubricating Company will erect a new plant for the manufacture of its Keystone lubricating grease, &c., at Twentieth street and Allegheny avenue. The building will be 40 x 230 feet, two stories high, and of the slow burning construction type. The entire first floor of the new building will be used for manufacturing, the second floor containing office apartments 40 x 75 feet. Electrical power will be used almost entirely, while the machinery and other equipment required will be largely of a special nature.

Contracts have been awarded by the Rapid Transit Company of this city to the General Electric Company for the electrical equipment for the new Market street elevated and underground railway. The covered third-rail system will be used. A good portion of the work on the subway has been completed while structural work on the elevated in West Philadelphia will probably be started by July 1.

The Ajax Metal Company will construct a new fire proof pattern loft at 52 Richmond street. The loft is to be built of steel, Mitchell Bros. of this city having the contract for erection.

The Eynon & Evans Mfg. Company is quite busy in the foundry and machine departments, the former having a number of orders for acid resisting bronze and other castings for parties in both the anthracite and bituminous coal fields. It has recently greatly increased the facilities of this department of its plant by the introduction of molding machines and other labor saving devices, and can now handle castings much more expeditiously than heretofore. An increased demand is noted for gas producer blowers, a number of which have been delivered to steel works in the Middle West, while the inquiry for condensers, injectors, &c., continues quite good.

Manning, Maxwell & Moore, through their Philadelphia branch, have recently booked orders for a number of large turret lathes for various local and nearby parties. Orders for axle lathes for the Atlantic Coast Line have been booked, as have also orders for railway shop tools from the Pennsylvania Railroad Company. They note an increased demand for small drill presses, while a number of large radial drills have also been sold. The recent volume of business has been quite satisfactory and from indications at the time they look forward to a largely increased business in the near future.

The Philadelphia Roll & Machine Company has its new addition to the machine shop now under roof and is pushing the completion of the building. A new and larger core oven will be built by this company as soon as the present work is completed. The company notes a very heavy demand for both chilled and sand cast rolls, particularly of the heavy class, several orders for rolls upward of 15 tons weight each having been recently taken. The company continues very busy in all departments and from present indications, it advises us, will no doubt continue so for some time ahead.

The Neafie & Levy Ship Building Company launched successfully on the 6th inst. the protected cruiser St. Louis, building for the United States Government. This vessel was at the time of launching over 75 per cent. completed, the boilers, masts and 80 per cent. of the auxiliary machinery being in place. The St. Louis is 424 feet long on the load water line, breadth 66 feet, has a displacement of 9700 tons and the contract speed is 22 knots per hour.

In connection with the course in shop management which is a part of the work in the department of mechanical engineering of the Worcester Polytechnic Institute, the students are now assisting on the inventory and closing the work for the fiscal year of the Washburn shops. These students will also have in charge the making out of a part of the annual report of the director of the shops to the trustees of the Institute. This course was the subject of a recent editorial in *The Iron Age* and subsequent general discussion by correspondents in the columns of the publication.

Government Purchases.

WASHINGTON, D. C., May 9, 1905.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until June 6 for machine tools for the Portsmouth, Boston and Norfolk navy yards, as follows: Schedule 244, drop hammer, trimming press, dust collecting system; schedule 245, grinders, electric traveling crane, drills, planers, shapers, polishers, milling machines, band saws, &c.

Bids will also be received at the Bureau of Supplies and Accounts, Navy Department, Washington, until June 6 for a quantity of supplies for the Mare Island and Puget Sound navy yards.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 23 for a quantity of supplies for the Pensacola, New Orleans, Key West and San Juan naval stations, including pumps, &c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 31 for a quantity of supplies for the Eastern navy yards, including motor, pneumatic punches, &c.

The Ordnance Department, Washington, D. C., will receive bids until May 31 for four 6-inch disappearing gun carriages, model of 1905.

Bids for machinery, drills, lathes, pneumatic machinery, &c., were opened by the Isthmian Canal Commission on May 1, as follows:

Bidder 1, C. T. Patterson & Co., New Orleans, La.; 2, Rand-Meyer Carpentry Company, Cincinnati, Ohio; 3, J. W. Creager Agency, Philadelphia, Pa.; 4, Thomas H. Dallett, Philadelphia, Pa.; 5, Hermann Boker & Co., New York; 6, H. A. Rogers Company, New York; 7, Rand Drill Company, New York; 8, Niles-Bement-Pond Company, New York; 9, Lee Mfg. Company, Port Huron, Mich.; 10, Pratt & Whitney Company, Hartford, Conn.; 11, Springfield Machine Tool Company, Springfield, Ohio; 12, Railway Appliances Company, Chicago, Ill.; 13, Erie Mfg. & Supply Company, Erie, Pa.; 14, American Woodworking Machine Company; 15, Handlan-Buck Mfg. Company, St. Louis, Mo.; 16, American Hoist & Derrick Company, St. Paul, Minn.; 17, Ingersoll-Sergeant Drill Company, New York; 18, Williams, Sellers & Co., Philadelphia, Pa.; 19, J. J. McCabe, New York; 20, Fox Bros. & Co., New York; 21, Royce & Ricketts, Washington, D. C.; 22, Fairbanks Company, Baltimore, Md.; 23, Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa.; 24, American Tool Works Company, Cincinnati, Ohio; 25, Vandyck, Churchill Company, New York; 26, Prentiss Tool & Supply Company, New York; 27, Hamilton Machine Tool Company, Hamilton, Ohio; 28, Cleveland Pneumatic Tool Company, Cleveland, Ohio; 29, Manning, Maxwell & Moore, New York.

Class 1. Three universal cutters and tool grinders—Bidder 1, $771.84; 3, $636; 15, $885; 20, $823.98; 22, $843; 26, $840; 29, $860.10.

Class 2. Three turret lathes—Bidder 1, $1717.50; 11, $1629 and $1899; 29, $1406.61.

Class 3. Three new model turret lathes—Bidder 1, $2879.10; 10, $3420.

Class 4. One pointing tool—Bidder 1, $18; 10, $7.60.

Class 5. One end pointing and forming tool—Bidder 1, $18; 10, $15.20.

Class 6. Three universal turning tools—Bidder 1, $102.51; 10, $65.55.

Class 7. One taper turning tool—Bidder 1, $45; 10, $38.

Class 8. One ¾-inch die head—Bidder 1, $63.50; 3, $75; 10, $66.50; 13, $71.50 and $83.50; 15, $110.

Class 9. One 1½-inch die head—Bidder 1, $166; 3, $174; 10, $159.15; 13, $169 and $195; 15, $155.

Class 10. One 12-inch combination chuck fitted to spindle—Bidder 1, $28; 10, $28.50; 15, $34.

Class 11. One ¾-inch drill chuck—Bidder 1, $11; 10, $9.15.

Class 12. One 1½-inch drill chuck—Bidder 1, $15; 10, $20.20; 29, for items 3 to 12 inclusive, $3994.20.

Class 13. Six quick change engine lathes—Bidder 2, $2517.60; 3, $3255; 8, $3900; 11, $3444; 15, $3990; 19, $3354; 20, $3726; 22, $4434; 24, $3900; 26, $3894; 29, $3061.28.

Class 14. One 39-inch driving wheel—Bidder 8, $2627; 18, $4455; 29, $3751.65.

Class 15. One 60-inch double head planer—Bidder 8, $5355; 18, $5575; 19, $3265; 20, $3036.60; 22, $4960; 24, $5680; 26, $4195; 27, $4000; 29, $4786; 3, $3000.

Class 16. Six double head planers—Bidder 8, $7680 and $8334; 18, $8310; 19, $6840; 20, $7256.40; 22, $9180; 24, $9510; 26, $7080; 27, $9000; 29, $8667.96; 3, $1000 each.

Class 17. One universal milling machine—Bidder 1, $962.80; 3, $925; 8, $935; 15, $1065; 19, $720; 20, $936.12; 22, $1024; 26, $1020; 29, $929.78.

Class 18. One No. 3 plain milling machine—Bidder 1, $664.24; 3, $635; 8, $633; 15, $817; 19, $535; 20, $691.25; 22, $704; 26, $675; 29, $692.37.

Class 19. Four 14-inch upright drill presses—Bidder 1, $231; 3, $208; 20, $227; 26, $196; 29, $400.20.

Class 20. Six 20-inch upright drill presses—Bidder 1, $480; 3, $450; 6, $484.80; 20, $458.40; 24, $546; 26, $492; 29, $467.10; 27, $660.

Class 21. Three three-spindle 26-inch stationary head gang drills—Bidder 1, $1643.25; 3, $1470; 20, $1569.72; 29, $1713.60; 26, $1494.

Class 22. Four 31-inch upright drill presses—Bidder 1, $1357.20; 3, $1008; 6, $1388; 20, $1291.52; 26, $1436; 29, $1329.12; —, $1700.

Class 23. Two 6-foot radial drilling machines—Bidder 1, $2580; 3, $2150; 8, $2322; 19, $2690; 20, $2514.60; 21, $2406 and $2556; 22, $2628; 24, $2646 and $2832; 26, $2820; 29, $2254.60.

Class 24. Three No. 1 centering machines—Bidder 1, $384; 10, $431.10; 15, $405; 29, $466.08; 8, $4131.

Class 25. Three 37-inch boring and turning mills—Bidder 3, $4575; 29, $4205.25.

Class 26. One 96-inch boring and turning mill—Bidder 3, $3700; 8, $3735; 18, $4665; 26, $3990; 29, $3400.09.

Class 27. Two 1½-inch double stay bolt cutters—Bidder 1, $1262; 3, $1240; 15, $1280; 13, $1316; 27, $1213.10; 29, $1153.88.

Class 28. Two No. 2½ horizontal boring and drilling machines—Bidder 8, $4116; 21, $2560; 26, $4600; 29, $4475.34; 18, $4950.

Class 29. Three No. 2 cold saws—Bidder 6, $2832; 20, $2553.75; 23, $3238.40; 29, $3507.21; 12, $2175; 29, $2832.

Class 30. Automatic saw sharpening machine—Bidder 6, $450; 12, $225; 15, $720; 20, $431.61; 23, $444.54; 25, $450; 29, $531.72.

Class 31. One 40-inch automatic knife grinder—Bidder 20, $339.44; 29, $233.75.

Class 32. Six No. 14 emery wheel stands—Bidder 1, $174.90; 20, $184.38; 29, $361.86.

Class 33. Three No. 0 wet tool grinders—Bidder 20, $214.47; 29, $347.35.

Class 34. Three 100-pound helve hammers—Bidder 3, $2370; 6, $2505; 8, $1620; 15, $2370; 20, $1457.25; 29, $1414.61.

Class 35. One 2000-pound double frame steam hammer—Bidder 1, $1708; 3, $2185; 8, $1845; 13, $1735; 18, $1755; 20, $1675.10; 29, $1739.83.

Class 36. One No. 4 vertical hollow chiseled carved mortising machine—Bidder 3, $1075; 6, $1098; 15, $1275; 29, $1459.29.

Class 37. One mortiser and boring machine complete—Bidder 3, $240; 6, $235; 15, $540; 29, $177.39; 14, $175.

Class 38. One No. 4 four-roll double cylinder planer and matcher—Bidder 3, $750; 6, $799; 14, $590; 15, $660; 29, $689.76.

Class 39. One No. 4 car ripping saw—Bidder 3, $350; 6, $301; 14, $502.66; 15, $500; 29, $544.50.

Class 40. One No. 2 three-spindle car boring machine—Bidder 3, $575; 6, $543; 15, $650; 29, $846.92.

Class 41. One 24-inch pattern makers' lathe—Bidder 3, $450; 6, $137; 14, $130; 29, $87.65; 1, $90.50.

Class 42. Three 26-inch portable valve seat rotary planing machines—Bidder 6, $600; 8, $555; 15, $750; 20, $564; 29, $508.83; 26, $582.

Class 43. Twelve drill chucks—Bidder 3, $74.40; 10, $71.76; 15, $81; 13, $76.80; 29, $71.28.

Class 44. Twenty-four high speed drills—Bidder 5, $1101.36; 10, $789.60; 15, $846; 29, $690.38.

Class 45. Six high speed drills—Bidder 5, $1829; 10, $1138.80; 15, $1220.40; 29, $1121.47.

Class 46. Six high speed drills—Bidder 5, $1233.60; 10, $1180.80; 15, $1265.40; 29, $1163.10.

Class 47. Six No. 1 washout plug taps—Bidder 10, $25.20; 15, $27; 29, $23.40.

Class 48. Six No. 2 washout plug taps—Bidder 10, $31.50; 15, $33; 29, $27.

Class 49. Three No. 3 washout plug taps—Bidder 10, $18.90; 49, $19.50; 29, $16.20.

Class 50. Three No. 4 washout plug taps—Bidder 10, $22.05; 15, $22.50; 29, $18.90.

Pneumatic Machinery.

Class 51. Six No. 1 clipping hammers—Bidder 3, $360; 4, $312; 7, $310.50; $17, $283.50; 28, $330; 29, $360.

Class 52. Three No. 11 reversible flue rolling machines—Bidder 3, $270; 7, $236.25; 17, $202.50; 29, $270.

Class 53. Three No. 12 reversible flue rolling machines—Bidder 3, $270; 7, $225; 29, $270; 17, $202.50.

Class 54. One No. 0 nonreversible drill—Bidder 3, $110; 7, $95; 17, $90; 29, $110.

Class 55. Four No. 3 wood boring machines—Bidder 3, $260; 7, $214; 17, $189; 28, $240; 29, $260.

Class 56. Four No. 5 wood boring machines—Bidder 6, $255; 17, $270; 29, $300; 3, $300.

Class 57. Three No. 4 breast drills—Bidder 7, $160.50; 17, $101.25; 28, $128; 29, $150; 3, $150.

Class 58. Two No. 1 long angle gears—Bidder 17, $70; 29, $70; 3, $70.

Class 59. Two No. 2 short angle gears—Bidder 17, $17; 29, $70; 3, $70.

Class 60. Two No. 3 angle gears—Bidder 17, $70, 29, $70; 3, $70.

Class 61. Two No. 6 pneumatic motors—Bidder 9, $2351.50; 17, $353.60; 29, $468; 3, $468.

Class 62. Two No. 14 10-ton hoists—Bidder 3, $928.40; 9, $714; 17, $760.50; 29, $926.40.

Class 63. Six No. 10 1-ton hoists—Bidder 3, $923.40; 9, $714; 17, $760.50; 29, $973.80.

Class 64. Six No. 12 3-ton hoists—Bidder 3, $1350; 7, $900; 9, $1202.28; 17, $1332; 29, $1354.20; 16, $888.

Class 65. One 3-ton foundry elevator—Bidder 3, $413.70; 9, $201.40; 29, $419.70; 17, $426.85.

Class 66. Four No. 61 16-ton plain air jacks—Bidder 3, $821.04; 17, $863; 29, $829.04.

Class 67. Two No. 62 7-ton sulky air jacks—Bidder 3, $290.52; 17, $317; 29, $292.52.

Class 71. One 18-inch forging machine, with dies—Bidder 17, $3750; 29, $3708.44.

The following bids were opened May 3 at the office of the Isthmian Canal Commission for 12 steam shovels, type B:

Marion Steam Shovel Company, Marion, Ohio, 95-ton shovels, $156,780.

Bucyrus Company, South Milwaukee, Wis., 90-ton shovels, $143,800; 95-ton shovels, $151,800.

John Southard & Co., Boston, Mass., Royce & Ricketts, Washington, D. C., agents, 1 cubic yard bucket machine, $5000 each; 2 cubic yards, $6500; 3 cubic yards, $7500; 2 cubic yards broader gauge, $5800; prices f.o.b. Boston.

The following bids were opened April 29 for coal storage and coal handling plant at the naval station, New Orleans, La.:

Wellman-Seaver-Morgan Company, Cleveland, Ohio, item 1, $164,000.

Snare & Triest Company, New York, item 1, $147,900; item 2, $147,400.

Hoshor-Platt Company, New York, item 1*a*, $147,300; *b*, $143,180; *c*, $141,210; *d*, $139,196; *e*, $138,050; *f*, $136,010; *g*, $132,900; *h*, $129,350; *i*, $128,141; *j*, $127,810.

The following bids were opened May 2 for machinery for the Eastern navy yards:

Bidder 11, Atlantic Works, Incorporated, Philadelphia, Pa.; 20, Bridgeport Brass Company, New York; 21, George F. Blake Mfg. Company, New York; 25, Bentel & Margedant Company, Hamilton, Ohio; 28, A. S. Cameron Steam Pump Works, New York; 49, M. T. Davidson, Brooklyn, N. Y.; 61, J. A. Fay & Egan Company, New York; 62, J. A. Fay & Egan Company, Cincinnati, Ohio; 68, Richard W. Geldart, New York; 72, M. Garland Company, Bay City, Mich.; 101, Manning, Maxwell & Moore, New York; 170, Warren Steam Pump Company, New York; 171, Walker Electric Company, Philadelphia, Pa.; 180, John D. Westbrook, Norfolk, Va.; 181, American Wood Working Machinery Company, New York.

Schedule No. 146.

Class 1. One sand belt machine complete—Bidder 25, $145; 61, $199.75; 68, $139.94; 101, $140; 181, $145.

Schedule No. 147.

Class 2. Two electric emery grinders—Bidder 180, $592.

Class 3. One band saw mill and spare parts—Bidder 62, $7123.96; 72, $8770, part.

Class 4. One heavy iron frame dimension planer—Bidder 11, $3000; 62, $4028.58.

Class 5. One saw roller or stretcher attachment and retoother—Bidder 62, $246.68.

Class 6. One automatic emery wheel band saw scarfing machine—Bidder 62, $151.30.

Schedule No. 148.

Class 7. Two centrifugal duplex piston fire pumps—Bidder 20, $2570; 49, $2360.

Schedule No. 166.

Class 63. Twelve vertical single boiler feed pumps—Bidder 21, $670.80; 28, $948; 49, $594; 171, $651.60.

Class 64. Two vertical steam pumps—Bidder 21, $117.80; 28, $140; 49, $96; 170, $108.60.

The following additional awards have been made for machinery for the Eastern navy yards, bids for which were opened April 11:

Niles-Bement-Pond Company, New York, class 1, one upright drill with motor drive, $310; class 2, four electrically driven dry emery grinders of column type, $948.

Manning, Maxwell & Moore, New York, class 5, one open side planer, $1865.

Hendey Machine Company, Torrington, Conn., class 7, one motor driven 14-inch engine lathe, $945.

General Electric Company, Schenectady, N. Y., class 10, two electric ship hoists, $1955.12.

A. S. Cameron Steam Pump Works, New York, class 73, two vertical steam pumps, $118.

Under bids opened April 18 for electric motors for the Eastern navy yards the Burke Electric Company, Erie, Pa., was awarded class 1, one electric motor, $232.25, and the Rochester Electric Motor Company, Rochester, N. Y., class 51, 20 electric motors, with controlling panels and spare parts, $3580.05.

Under bids opened April 25 for supplies for the Mare Island, Puget Sound, Pensacola and Norfolk navy yards the following awards have been made:

California Electric Works, San Francisco, Cal., class 8, one 8 horse-power slow speed shunt wound electric motor, $190; class 27, two 20 horse-power shunt wound motors, $780.

Hallidie-Henshaw-Bulkley Company, Seattle, Wash., class 18, one sliding bed gap lathe, $611.05.

Iron and Industrial Stocks.

NEW YORK, May 10, 1905.

The market for industrial securities has fluctuated somewhat rapidly during the past week. The lowest point was touched during Monday when United States Steel common sold down to 29⅞, and preferred, ex-dividend, to 96⅞. Allis-Chalmers common has gradually risen to 14⅝. American Can Company common fluctuated between 11⅜ and 12⅜, closing at 11¾ for the common, while the preferred closes at 70. American Locomotive common was as low as 45 on Thursday last, but has since recovered to 49, the preferred selling at 113. Colorado Fuel & Iron ranged between 41⅝ and 44½, reaching 45⅝ to-day. Tennessee Coal & Iron has fluctuated considerably, going as high as 83 on Friday and Saturday of last week, but reacting to 81½. Sloss-Sheffield common ranged between 76 and 78, closing at 76⅛, while the preferred is quoted at 115. Republic has been fairly steady, ranging between 17¼ and 18, and closing at 17¾, with the preferred at 73.

The Alabama Consolidated Coal & Iron Company reports that for the first quarter of this year the net earnings were $190,936. After paying fixed charges this left a surplus of $135,000. The output of the company has been greatly increased within the last few months, the average output of coal now running to about 14,000 tons a week, or at the rate of 750,000 tons a year, and the coke to over 25,000 tons a month. The iron output, likewise, is being greatly increased, and in addition the company is now building as rapidly as possible another furnace at Gadsden at a cost of $350,000 to make 200 tons of iron a day.

There is much general interest in the plan of the management of the United Shoe Machinery Company, Boston, to change its scheme of stock ownership by transferring the entire property to a new corporation known as the United Shoe Machinery Corporation. The purpose is believed to be to dispose of undivided profits among the stockholders of the present company, and at the same time give added value to the common stock by taking away certain privileges of the preferred stock now existing. Both the new and the old companies are New Jersey corporations. The United Shoe Machinery Corporation is capitalized for $50,000,000, the shares of $25 par value each, divided into 600,000 shares of preferred stock and 1,400,000 shares of common stock. The new company offers for the stock of the present company one share of the preferred stock and 37½ cents in cash for each share of preferred stock of the United Shoe Machinery Company, and one and one-half shares of common stock and 75 cents cash for each share of the common stock. The preferred stock of the new company is preferred as to dividends at the rate of 6 per cent., and in the event of liquidation is entitled to $35 a share, which is 40 per cent. above par value. But in consideration of these advantages the preferred stock shall not be entitled to any further share in the profits of the corporation nor to any right to subscribe to any stock of the corporation that shall be hereafter authorized. The holders of preferred stock shall have equal voting rights with the common stock, except, so long as dividends upon the preferred stock shall have been paid, the preferred stock shall have no voting power as to increase in authorized capital stock by any common stock. By this plan the United Shoe Machinery Company distributes in cash something over $5,800,000 to its stockholders, it is stated. The officers of the new corporation are the same as those of the old. Only so much of the $50,000,000 authorized as shall be necessary to carry out this offer will be issued at this time.

The Riverside Bridge Company of Wheeling, W. Va., has increased its capital from $200,000 to $500,000, to be used in making large extensions and improvements to its works. The company has elected directors as follows: N. E. Whitaker, Henry Schmulbach, Harrison Bettis, O. R. Wood, John Howard, A. T. B. Sommerville and F. J. Park.

Dividends.—Niles-Bement-Pond Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable May 15.

Pratt & Whitney Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable May 15.

American Radiator Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred and 1 per cent. on the common stock.

Shelby Iron Company has declared a dividend of 5 per cent., payable June 1. This is the first dividend declared by the company since October, 1903.

Cleveland Furnace Company has declared an initial dividend of 3 per cent.

J. G. White & Co., New York, have declared an annual dividend of 6 per cent. on the preferred stock, payable June 1.

HARDWARE.

THE questions connected with transportation are of as immediate and direct importance to Hardware as to other merchants, and it is gratifying to observe indications that the subject is to receive from this department of the commercial community more attention than has been given to it heretofore. From the announcement in another column it will be seen that this question will be considered in some of its various relations to Hardware merchants and manufacturers at the approaching meeting at Virginia Hot Springs, where the Manufacturers' Association is making it one of the topics for discussion. The Hardware jobbers, too, without official action, we believe, of any of the associations which represent their interests, are taking the matter up, as, for instance, in the presentation of their views before the Senate Committee on Interstate Commerce, with a view to preventing action or recommendation by such committee which would be detrimental to the interests of the commercial classes with which they are identified. Some of the general principles which are regarded as applying to the problems connected with transportation questions, and especially the Governmental regulation of rates, are referred to in the forcible address of a prominent jobber before the Senate Committee, a report of which is given in another column.

Apart from these grave and, indeed, fundamental problems there are others which well deserve consideration by the Hardware trade, all of whom, whether as manufacturers or distributers, in one way or another are only too familiar with the annoyance and loss resulting from confusion and inequity in classification, delay in transportation, difficulty in securing redress for damage or loss of goods, or unreasonable detention en route, especially in the case of seasonable articles, and other defects and grievances connected with transportation of merchandise. These and other similar matters are of direct concern to all in the trade, and it is gratifying that the subject is to be taken up under able leadership by the American Hardware Manufacturers' Association in a definite and practical way. It is obviously a subject, too, to which the various associations, even of retail merchants, can advantageously give attention, discussing it in its practical bearings and agitating for a reform and the correction of existing abuses and the adoption of improvements in connection with transportation methods. In this way merchants generally, and independently of trade organizations, may effectually contribute to the bringing about of a better condition of things. In its broader aspects the subject is sure to be one which will command public attention, and very favorable opportunity is thus given for discussion of it in its relation to what might be considered minor matters, such as are referred to above, which have, however, a direct and important bearing on the welfare and convenience of the trade. It is therefore proper that the question should be considered by each merchant and manufacturer in the light of his own experience and interests.

Condition of Trade.

The features of the present situation which are most noteworthy are the general employment of labor, the prosperity of the people, the excellent volume of business and the confident feeling which prevails. In this state of things there is little to call for special mention, particularly as the trade with which *The Iron Age* has to do is moving along in excellent volume. The tone of the market is, on the whole, steady, there being from time to time the announcement of advances, with here and there indications of less strength than heretofore, and a greater desire on the part of manufacturers to secure orders in certain lines. This is the case in regard to some heavy goods, notwithstanding the fact that they lie near the raw material, where so strong a tone has prevailed. Advances in times past have sometimes been made by manufacturers which were to a certain extent nominal and were put into effect apparently for their general influence on the market and with a view to stimulating purchases, and there have recently been some evidences of a disposition thus to influence the market, but as a rule values are firmly maintained, and the changes in prices are few and unimportant. In the present situation the merchant is justified in covering his requirements in a reasonable and, perhaps, liberal spirit, as there is the promise of a free movement of goods from the distributers into the hands of consumers, general enterprise being active, much building being in progress, and the people as a rule purchasing commodities of practically all kinds in a way which reflects and results from the prosperous conditions which exist.

Chicago.

The month of April in Chicago Hardware circles, both wholesale and retail, seems to have fallen a little behind March, but notwithstanding that fact April business has been excellent. March was with most interests a record month, and much of the business done in that month was in lines that do not ordinarily move until April. The teamsters' strike is still on, and for the last two weeks has interfered quite a good deal with the Hardware trade, both wholesale and retail, though in some cases it has led to a larger than usual demand on jobbers' stocks from dealers who wished to have stores laid in for protection against a possible general tie-up of all teams. Hardware business in general is in a very satisfactory condition. Demand for goods is most active, and yet as a rule the mills are able to keep jobbers well supplied and to make rather more prompt shipments than might be expected from the large volume of goods moving. Refrigerator business has been better with jobbers and manufacturers than they expected, because it was known that large stocks had been carried over from last year owing to the cold spring and summer of 1904. There is a shortage in some lines of high priced Refrigerators, as the demand this year seems to be for the better goods, but this shortage is looked upon as temporary and affecting only a few makers. Wet weather for the last week or two has led to such a heavy growth of grass that Lawn Mowers have been in unusually good demand for a season as early as this. Lawn Hose and Fixtures are correspondingly slow in demand, but one or two dry weeks between now and July will be sufficient to make up for whatever slackness there is in that direction. In some lines there is a temporary unsettlement of prices, owing to concessions made by jobbers to reduce stocks, but business in general is done at a good profit margin on the part of jobber, manufacturer and retailer.

NOTES ON PRICES.

Wire Nails.—The impression that an advance in price is possible is causing more activity on the part of some jobbers in placing orders. This branch of the trade stocked up heavily at lower prices and many firms still have good stocks on hand, which, however, have been materially reduced during the past two or three weeks. The policy pursued by the largest producer has been not to unduly advance prices on Wire and Wire products. The market during the past few weeks has been subject to conflicting tendencies, there being some reason to anticipate an advance, especially in view of the cost of

the raw material, which makes competition difficult for mills which have not their own supplies, while at the same time a slight weakness has developed in some quarters, as jobbers are shading prices a little and some manufacturers are making inducements for the placing of orders. In this condition of things the Wire and Wire Nail interests are conferring as to the course to be pursued, but at the time of our going to press we have no advices as to the decision reached. Official quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.80
Carloads to retailers	1.85

New York.—The month of April proved to be a record month with jobbers in Wire Nails sold from store, somewhat contrary to expectations. Business from points tributary to this city was not of corresponding proportions, though excellent. Present demand is steady and keeps up well. The market is firm and New York quotations are as follows: Single carloads, $1.99; small lots from store, $2.05.

Chicago, by Telegraph.—Activity on the part of the leading interest in soliciting business has led to an impression that a price advance is not far off. Should this be made it will be in part at least for its effect upon the market rather than because it is required by market conditions, as the mill season is about closed and large stocks are still in the hands of jobbers unsold. Official prices are unchanged, at $1.95, base, in car lots to jobbers; $2 in car lots to retailers, with 5 cents advance for less than car lots from mill.

Pittsburgh.—Advices are that demand for Wire Nails is showing some betterment, due to the fact that large stocks held by jobbers are moving out more freely and also because of the expected advance in prices which may be made before this week is out. It is understood the Wire Nail mills will confer at an early date in regard to making a conservative advance over the present price. We quote: Carload lots, $1.75 to $1.80; less than carload lots to jobbers, $1.85, and to retailers, $1.95, f.o.b. Pittsburgh. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities, 10 cents per keg advance over Steel Cut Nails.

Cut Nails.—At the last meeting of the Cut Nail Association it was agreed that in the event of an advance in the price of Wire Nails being made before the next meeting a corresponding advance in Cut Nails would take place without further conference on the part of manufacturers. Demand shows some improvement, and prices on the part of manufacturers are regarded as being held at more nearly official figures. Quotations are as follows: Carload lots, $1.80; less than carload lots to jobbers, $1.85, and to retailers, $1.95, f.o.b. Pittsburgh. Iron Cut Nails, for delivery at Pittsburgh, Buffalo and all points west of these cities, 10 cents advance per keg on Cut Steel Nails.

New York.—Quite a fair proportion of Cut Nails is included in orders received by jobbers. According to reports regular quotations are more nearly maintained. New York quotations are as follows: Carloads on dock, $1.94; less than carloads on dock, $1.99; small lots from store, $2.

Chicago, by Telegraph—Prices and conditions remain as they have been through the greater part of the spring, and it is evident that the supply of Cut Nails is to say the least ample to meet the demand, and prices are none too firm. The recent reduction in the price of Scrap, which is used by many makers of Cut Nails, is not adding strength to the Cut Nail market. Steel Cut Nails are sold in car lots to retailers or consumers at $1.90, base, and to jobbers at $1.85, both prices being 10 cents below the official Wire Nail schedule. Iron Cut Nails made from muck bar iron are ordinarily quoted at from $1.95 to $2, with some makers able to secure even higher prices because of a reputation for quality.

Pittsburgh.—Demand for Cut Nails does not show much improvement, and concessions over the official prices are still obtainable. Stocks in jobbers' hands are large, but with the present favorable weather and an active building season it is believed these will move out more freely before long. We quote Steel Cut Nails at $1.70 in carload lots and $1.75 in less than carload lots, f.o.b. Pittsburgh. For strictly Iron Cut Nails an advance of 10 cents a keg is charged over above prices.

Barb Wire.—Demand from mills in new business is comparatively light, as fence building by farmers has been displaced by more urgent work. Quotations are unchanged as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.95	$2.25
Retailers, carload lots	2.00	2.30
Retailers, less than carload lots	2.10	2.40

Chicago, by Telegraph.—As far as the mills are concerned spring business is about closed, though there are still large quantities of Wire in the hands of jobbers and retailers. Prices are unchanged, as follows: Car lots to jobbers, Painted Wire, $2.10; Galvanized, $2.40; car lots to retailers, 5 cents higher; less than car lots, Painted Wire, $2.25; Galvanized, $2.55; Staples, Bright, in car lots to jobbers, $2.05; Galvanized, $2.35; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Farmers are now engaged in putting in their crops instead of building new fences, and for this reason demand has fallen off. Stocks in jobbers' hands, which are heavy, are moving out more freely, and there is a report current that prices may be advanced in the next few days. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.95	$2.25
Retailers, carload lots	2.00	2.30
Retailers, less than carload lots	2.10	2.40

Smooth Fence Wire.—No change has taken place in the demand from mills, which continues light. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.65
Retailers, carloads	1.70

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—Prices are firm and unchanged, as follows: $1.80, base, for Annealed Wire, in car lots to jobbers; $1.85 in car lots to retailers, with 5 cents advance for less than car lots, and 30 cents premium over Annealed for Galvanized.

Pittsburgh.—Demand continues quiet and mills are pretty well caught up with orders. It is reported, but not officially confirmed, that an advance in prices may be made by the mills at a very early date. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.65
Retailers, carloads	1.70

Binder Twine.—It is understood that some Western jobbers are offering Sisal and Standard Twine down to 9½ cents, notwithstanding the new schedule of the International Harvester Company of 10 cents. This company has advanced the price of Manila Twine to 12¼ cents. It is now believed that a larger quantity of Twine was purchased at the lower prices early in the season than had been supposed. A large amount of Twine still remains no doubt to be purchased, and merchants who were fortunate enough to buy at lower prices can increase their profits by raising their prices in proportion to the advance. The market appears somewhat unsettled by the shading of prices, but the accompanying quotations of the Harvester Company will act as a guide to buyers:

	Per lb.
Sisal	10 c.
Standard	10 c.
Standard Manila (550 feet)	11 c.
Manila (600 fet)	12¼c.
Pure Manila (650 feet)	13½c.

Five-ton lots, ⅛ cent less; carload lots, ¼ cent less, Chicago delivery, usual terms of payment. Kansas City, Omaha, Council Bluffs and Minneapolis, ¼ cent added. Prices not guaranteed. Allowing for freight, New York prices would be ¼ cent lower than the above.

Rope.—While demand is fair, it has not increased in proportion to manufacturers' expectations as the season has advanced. The market is naturally somewhat affected by the slow movement of stocks, and while no change in quotations has been made, desirable orders at slight concessions in price are sometimes accepted. General quotations are as follows: Pure Manila, 11¾ to 12 cents; Pure Sisal, 10 cents; No. 2 quality Sisal, 8 to 8¼ cents per pound.

Window Glass.—The production of Glass is being curtailed by the closing down of factories, and the end of the month will probably witness the going out of blast of most of the factories. This fact may prevent manufacturers making lower prices, though the low quotations of 90 and 40 per cent. discount by the American Mfg. Company on the first three brackets has caused some low prices to be made by manufacturers of hand made Glass. A meeting of the Manufacturers' & Jobbers' Window Glass Company is scheduled for this week. Locally a slight improvement in demand is noticed. New York quotations are about as follows: First two brackets, single, 90 and 20 per cent. discount; all other sizes, single and double, 90 and 10 per cent. discount. Where jobbers are urgent to move stocks these quotations are sometimes shaded to a limited extent.

Oil.—*Linseed Oil.*—Outside of a fair delivery on contract orders and small jobbing orders to cover immediate requirements the market is quiet. An independent crusher, it is understood, has offered to take contracts for delivery up to July 31 at 46 cents. This is an exceptional case, as most crushers of this class are holding for higher prices. Spot seed is held at $1.39 per bushel, and it is reported that October seed is being traded in at $1.12. Oil quotations are as follows: City Raw, 48 to 49 cents per gallon, according to quantity; State and Western Raw, 46 to 47 cents.

Spirits Turpentine.—The market has advanced during the week on Southern advices that all receipts were being taken. At this point there has been a good general demand, with a firm market. New York quotations, according to quantity, are as follows: Oil barrels, 61½ to 62 cents; machine made barrels, 62 to 62½ cents per gallon.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses, and are referred to the manufacturers:*

FROM THE LUTHE HARDWARE COMPANY, Des Moines, Iowa, wholesale exclusively, with a representation of 12 traveling salesmen, which is compiling a general Hardware catalogue of from 1200 to 1500 pages, and would like to receive catalogues and price-lists from manufacturers with whom they are not at present dealing whose lines or products can with propriety and profit be distributed through legitimate Hardware channels.

FROM THE MIAMI HARDWARE COMPANY, Miami, Fla., which has been organized with a capital of $50,000, and will be open for business soon after June 1. The new company will handle Hardware, Tinware, Vehicles, Paints and Oils, Saddlery, Sash and Doors, Plumbing Supplies, &c.

FROM HUNT & EDWARDS, 1323 Fourteenth street, Northwest, Washington, D. C., who handle General Hardware, Paints and Glass.

FROM FRANK C. BEALL, Frostburg, Md., wholesale and retail merchant, who requests trade literature devoted to Shelf and Heavy Hardware, Stoves, Tinware, Sporting Goods, Vehicles, Mill Supplies, House Furnishings, Plumbing Materials, &c.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

KEUFFEL & ESSER COMPANY, 127 Fulton street, New York: Trade price-list of Measuring Tapes illustrated in a large variety of styles; also showing Measuring Chains, Rules, Contact Levels, Thumb Tacks, &c.

BARRETT MFG. COMPANY, Chicago, Ill.: Illustrated descriptive catalogue relating to Roofing and Paving Pitch, Tarred Roofing Felts, Sheathing Felts, Building Papers, Black Diamond Roofing, Amatite Roofing and Coal Tar Products.

GEUDER & PAESCHKE MFG. COMPANY, Milwaukee, Wis.: Illustrated folder devoted to Coal Hods and Fire Shovels in a variety of styles.

HAYES PUMP & PLANTER COMPANY, Galva, Ill.: Catalogue of Sucker State Grain Drills, including Hoe, Disk, Shoe and Press Drills. The company also manufactures Corn Planters, Cultivators, Harrows, Pumps, Tanks, Cisterns, &c.

SILVER & Co., 304-314 Hewes street, Brooklyn, N. Y.: Catalogue No. 11 of Household Novelties, including Kitchen Articles, Night Lamps, Ice Cutters, Alcohol Stoves, Oil and Gas Heaters, Oil Cook Stoves, Gas Cook Stoves and Hot Plates, Ovens, Bath Fittings, &c.

THE KILBORN & BISHOP COMPANY, New Haven, Conn.: Catalogue No. 4, devoted to Expansive Bits, Countersinks, Pliers, Saw Sets, Box and Crate Openers, Cold Chisels, Magnetic Hammers, Repair Chain Links, Bridle Bits, &c. The company also makes Drop Forgings.

BELLEVILLE PUMP & SKEIN WORKS, Belleville, Ill.: Catalogues relating to Jack Screws, Ratchet and Wagon Jacks, House Raising and Press Screws, Copying and Way Bill Presses, Press Stands, Foot Valves and Strainers, &c.

THEO. J. ELY MFG. COMPANY, Girard, Pa.: Booklet illustrating and describing the company's line of Cross Cut Saw Handles.

LINCOLN-WILLIAMS TWIST DRILL COMPANY, Taunton, Mass.: Catalogue relating to High Speed Carbon Steel Twist Drills, including taper or straight shank, letter sizes, wire gauge, three or four groove and chucking Reamers. The company also makes Carbon Steel Drills, Bits for wood, taps and dies.

THE BRONSON-WALTON COMPANY, Cleveland, Ohio: Illustrated catalogue devoted to Bread, Biscuit, Cookie and Dripping Pans, Double Roasters and Bakers, Steel Coffee Mills, Heavy Tin Pails or Buckets, Wire Rope Clamps, &c.

CHARLES M. DALLY has resigned his position as secretary of the M. Hartley Company, 313-315 Broadway, New York. Mr. Dally has been identified with this interest for 17 years, serving in a confidential capacity the late Marcellus Hartley in the various important enterprises with which Mr. Hartley was connected. Mr. Dally will continue to make his headquarters with the M. Hartley Company until September 1, in the interval taking a holiday in Europe for about six weeks, leaving some time in June. Mr. Dally's exceptional knowledge of ordnance matters, together with a combination of energy and intelligence, moved the English Secretary of State, Lord Lansdowne, and the Secretary of State for War, to send him a joint letter two years ago, expressing their cordial appreciation of services rendered by him to the British Government, in connection with the rearmament of the English army with the 303 Remington-Lee rifle, in place of the Martini-Henry 45-caliber rifle. He was also concerned with the introduction of Harvey armor plate in England and Russia.

AMONG THE HARDWARE TRADE.

Frank M. Zehr has disposed of his stock of general Hardware at Croghan, N. Y., to Chas. Bruet & Son, who will continue at the old stand.

Stall & Johnston are successors to A. M. Nye in the Hardware business at Arcadia, Ohio.

Blakeman & Coleman have succeeded Blakeman & Hahn in Hardware, Stoves, Paints, Sporting Goods, &c., at Norfolk, Neb.

G. E. Gorman has purchased an interest in W. O. Skaggs' Hardware and Implement business at Allen, Kan., and the style has become Skaggs & Gorman.

Hays & Robertson have bought O. B. Chase & Co.'s Hardware, Stove, Implement and Sporting Goods stock at McLoud, O. T., and continue at the former stand.

J. H. Fowler has disposed of his interest in the Chester Hardware Company, Chester, W. Va., to his former partners, W. E. and H. G. Mercer, who will continue the business under the same style.

H. J. Bearer & Co., Monessen, Pa., have added Hardware and Paints to their former Tinning and Roofing business. The store has been reshelved, new showcases installed, &c.

L. C. Harrison has sold his interest in the Harrison Hardware Company, Pryor Creek, I. T., to P. W. & C. L. Samuel, who have incorporated the business under the style of Samuel Bros. Hardware Company, with the former as president and the latter as vice-president and manager, W. E. Butler being secretary and treasurer. The company handles Hardware, Implements, Stoves, Tinware, furniture, &c., the former stock of which has been materially increased.

Jones & Martin have sold their Hardware business at Deshler, Ohio, to A. V. Batson, formerly of Payne, Ohio. Mr. Jones has taken up the management of the Deshler Mail Box Company, and Mr. Martin has removed to Napoleon, Ohio.

Calhoun & Harvey, Browning, Mo., have succeeded to the general Hardware business heretofore conducted by Davis & Gable.

James E. Cooper, druggist, South Natick, Mass., has just opened up in the adjoining premises as a Hardware merchant, handling also Paints, Sporting Goods, &c.

W. R. Holmes, Catesfield, Neb., has disposed of his Implement business, but continues in the Shelf and Heavy Hardware, Stove, Paints, Sporting Goods and furniture lines.

Wm. H. Lomer has been succeeded in the Hardware business at St. Henry, Ohio, by John Gels & Bros., who continue at the old stand.

Whitson & Barnes Hardware Company, Cookeville, Tenn., is erecting a new establishment, which will be especially well aranged and commodious. The company conducts a wholesale and retail business in Hardware, Vehicles, Implements, Saddlery, Harness, &c.

Campbell & King are successors to Feltus & Campbell in the General Hardware, Stove and Sporting Goods business in Oelwein, Iowa, J. B. Feltus having retired.

William S. Johnson has bought the Hardware, Stove, Implement and Vehicle business heretofore carried on by Ostlund & Peterson, New London, Minn.

Ambrose & Knight have purchased S. E. Hodge's business at Urbana, Ohio, and will continue the sale of Shelf Hardware, Stoves, Tinware, Sporting Goods, &c., at the old stand.

Mersman Hardware Company, Covington, Ohio, has been incorporated with a capital stock of $50,000, J. H. Mersman, Henry Jansen, Edward Wever, Fred. Hemann, Michael I. Pfister and Frank Flake being the interested parties. The company will conduct the wholesale and retail business in Shelf Hardware, Stoves, Agricultural Implements, Paints, Sporting Goods, &c.

W. S. Nicholas has bought the Deiselman Hardware, Stove, Harness, Buggy and Furniture business at Geneva, Neb.

Geo. O. Brimhall, Hardware merchant, Minneapolis, Minn., has purchased the stock and building of Henry Jost, at 1407 Twentieth avenue, north, and will run both stores, the main establishment being at 404 and 406 Plymouth avenue.

Oaks & Rich have sold their Hardware, Stove, Implement and Paint business at Hartford, S. D., to Oaks & Babcock.

Southwick & Bevan have succeeded H. R. Southwick & Co., in the Hardware business at New Cambria, Mo. This is simply a change in style, the *personnel* of the firm continuing as heretofore.

Fuller & Wanzer, Quinter, Kan., have disposed of their drug department and will hereafter confine their attention to Hardware, Stoves, Paints, Sporting Goods, &c.

Zeb Bonner has purchased the Hardware, Stove and Paint business of Wareham & Sampson, at Beaver Falls, Pa.

Mosgrove Supply Company, Mosgrove, Pa., has bought out Mrs. A. Butler's business at that point.

Charles F. Curtis and Walter H. Crossley have bought the Hardware business of George B. Brooks, Auburn, Maine, and will conduct the store under the firm name of Crossley & Curtis.

C. J. White has bought the Hardware stock of E. A. Parsons, Arcade, N. Y., and will continue at the old stand.

Kern & Miller have succeeded Edwards, Kern & Miller in the Hardware, Stove, Implement and Plumbing business at Dansville, N. Y.

J. K. Bell has disposed of his Hardware and Harness business in Genesee, Idaho, to S. Driscoll, who continues at the old stand.

THE MERCHANT & EVANS COMPANY, 517 Arch street, Philadelphia, has purchased the property and assets of Merchant & Co., Incorporated, manufacturers, importers and jobbers of Tin and Terne Plates, Sheet Irons, Brass and Copper, Solders, Babbitt and Printing Metals, Star Ventilators, Spanish Tiles and domestic and foreign metals generally. The old organization and *personnel* remain unchanged with the new company, which announces that it will adhere rigidly to the high principles and conservative methods which always characterized the business founded and built up by Clarke Merchant. The company has been incorporated with a capital stock of $500,000. Powell Evans, who was vice-president for a number of years and president for the past year of Merchant & Co., Incorporated, with full knowledge of its business and methods, has organized and controls and is president of the new company.

COLONIAL FILE COMPANY, Neponset, Boston, Mass., issues a circular in which it calls attention to the merits of the Colonial Files and Rasps. These Files are said to be finished by a special process, which prevents a "wire edge."

LANDERS, FRARY & CLARK'S NEW QUARTERS.

LANDERS, FRARY & CLARK, New Britain, Conn., will, on or before May 15, vacate their present quarters in New York, at 82 Chambers street, and occupy an entire floor in the Vincent Building, 302 Broadway, corner of Duane street. The new showrooms will be large, ample and well adapted for a fine display of their goods, the rooms facing both Broadway and Duane street. That portion of the floor overlooking Broadway will be devoted to exhibiting their Table Cutlery, for which new fixtures have been made. Then come the offices, back of which will be a display room for their Hardware, and beyond that a room for storing stock.

DEATH OF VIRGIL P. HUMASON.

VIRGIL P. HUMASON, a director and treasurer of the Humason & Beckley Mfg. Company, New Britain, Conn., died suddenly at the Waldorf-Astoria Hotel, New York City, on Saturday afternoon, 6th inst. Mr. Humason had been suffering from an attack of acute indigestion for several days, but left his home in Yonkers to keep a business appointment. Feeling ill he walked into the café and asked an attendant to summon a physician, but in a few minutes he was dead.

Virgil P. Humason was born in Simsbury, Conn., in 1847, going to New Britain in 1850. His father was the late William L. Humason, who established the business of what is now the Humason & Beckley Mfg. Company, in 1853, and who died April 15, 1889, the concern having

VIRGIL P. HUMASON.

been successively W. L. Humason, Whitney & Humason, Doen & Humason, Humason, Beckley & Lockwood and Humason, Beckley & Co., until 1863, when the business was incorporated under the present style. Mr. Humason graduated from the New Britain High School in 1863 and from the Eagleswood Military Academy in 1866, when he was valedictorian of the class. In 1875, while still in business, he undertook a course in law, employing much of his spare time in that way, and in 1878 graduated with honors at the Law School of the University of the City of New York. He was admitted to the bar as attorney and counsellor-at-law May 15, 1878, but never practiced.

Mr. Humason was made treasurer of the Humason Company in 1866 and assumed charge of the branch house in New York January 1, 1871, a position he had since retained. During the last few years he had been director and vice-president of the Chapin-Stephens Company, Pine Meadow, Conn., manufacturer of Rules, whose business he also represented in New York. Other companies represented by him were the William Rogers Mfg. Company, Silver Plated Table Flat Ware, and West Silver Company, Silver Plated Hollow Ware.

Mr. Humason married Elizabeth Wilson of Hartford in 1870 and after her death married Mrs. Jessie K. Hull in 1885. He was one of the founders of the Hardware Club, a member of the Society of the Sons of the American Revolution and of the General Society of Colonial Wars. He is survived by a widow, two sons and three daughters, John E. Humason, a son, being associated with him in business. One daughter is the wife of Henry P. Jones of the Westinghouse Electric Mfg. Company, and another is the wife of Paul S. Wilcox, secretary of the Corbin Motor Vehicle Company. Mr. Humason was a man of fine character, genial and companionable and highly regarded by those who knew him.

SEDGWICK MACHINE WORKS.

THE business of the Sedgwick Machine Works, Poughkeepsie, N. Y., has increased to such an extent that the company has been compelled to increase its plant, and a new building has recently been completed which has doubled the floor space. This marks the largest expansion of facilities ever made by the company at one time. For more than 40 years the company has been manufacturing Elevators and Dumb Waiters, other goods which they had also been making having been dropped about 18 years ago, since which time a specialty has been made of hand power Elevators and Dumb Waiters, the business in which has grown steadily from year to year. The New York office of the company has been for about 10 years at 110 Liberty street, but these quarters have become inadequate and an entire building, 128 Liberty street, has been leased for a term of years. Renovations amounting almost to reconstruction of the building have been made, and while the new quarters are not yet entirely ready the company feels that it is in better shape than ever before to give customers prompt and satisfactory service.

YALE & TOWNE MFG. COMPANY'S NEW CHICAGO STORE.

THE YALE & TOWNE MFG. COMPANY has recently moved its Chicago office from the Silversmiths' Building, 131 Wabash avenue, where a suite of offices on an upper floor has been occupied for about six years, to a large, well lighted store and basement at 88 Lake street.

Since 1896 the commercial management of the company has been consolidated in its general offices, 9-15 Murray street, New York; the branch offices in Boston, Philadelphia, Chicago and San Francisco being maintained for the convenience of local customers. The increase of business in Chicago and vicinity necessitated the present move, where there are better facilities for the display of goods and carrying of stock. The new store will contain a handsome exhibit room for the use of dealers, architects and their clients, in inspecting and selecting finishing Hardware of the finer grades, of which the company manufacture large lines. A stock of staple goods will be carried in the store and basement to meet the wants of local dealers, and a repair department will be maintained for furnishing duplicate and extra Keys, Master Key work and repairs of all kinds. While shipments of stock orders are all made from the works at Stamford, Conn., the stock carried in Chicago, although intended chiefly for the convenience of local customers, especially in connection with "pick up orders," will also be available to other customers in the Northwest, where small quantities of special goods are needed in haste. The latter customers will also be able to use the Chicago repair department advantageously.

THE KELLY AXE MFG. COMPANY, whose New York office has been at 82 Chambers street, has been compelled to obtain other quarters, owing to the prospective demolition of that building to provide an additional site for the new Chemical Bank Building. The company's new office will be at 23 Warren street.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

A RETAILER'S ADVERTISEMENT SUBMITTED FOR CRITICISM

THE advertisement represented in the accompanying reduced illustration has been submitted to us for criticism by the Manchester Hardware Company, Manchester, N. H. It occupied the last two columns of the front page of the paper, its actual length being 20 inches and its width 4½ inches. We have taken pleasure in referring it for criticism to persons who have given a good deal of attention to the preparation of advertisements of retail Hardware stores, and we give below their estimate of its merits. It will be observed that their criticisms are in the main decidedly favorable, the advertisement in question being regarded as an admirable one, well calculated to accomplish its purpose.

We should be glad to hear from any of the trade in further criticism of this advertisement, with any suggestions as to how it might be improved or made more effective.

Criticism No. 1.

From a gentleman in New York who has given a good deal of attention to advertising matters and has succeeded in attracting trade to the store with which he is connected, we have the following expressions in regard to the advertisement:

This advertisement is a splendid example of enterprising Hardware methods. It shows keen realization of opportunity. All advertising must be made to conform to the season. The Manchester advertising is very carefully timed, the needs of a probable purchaser are anticipated and the reader is reminded of his or her needs. Sales are bound to follow where a person who needs a Lawn Mower is reminded of that fact.

Right at the very outset that "48 years near the City Hall" indicates the stability and the reliability of the firm. Then the paragraph concerning quality is good, when we are daily brought in contact with the creed that price or quantity, and not quality, is the all important thing. Quality is always best and a firm can have no better reputation than to be known as a quality store. In these days of 5 and 10 cent stores quality is a mighty good slogan.

Price Quality

Paints are rightly brought out conspicuously. This is Paint season, surely enough. The argument in this Paint paragraph is excellent, and most comprehensively condensed. Refrigerators, Flower and Lawn Seeds, Wire Netting, Garden Tools, Screen Door and Wire Cloth, Garden Hose, Wagon Umbrellas, Baseball Goods, Camera Supplies and Wire Fence Goods are every one of them timely. But Bread Mixers, Cobbling Sets, Sad Irons and Dog Sundries might more properly have been omitted from the present copy to make room for more seasonable items, such as Lawn Mowers, Sickles, Hedge Shears, Garden Trowels, Mole Trays and similar things, the use of which directly concerns the time. The advertisement is made up of spring necessities, therefore the note of consistency ought to be sounded in every detail of it.

Better Omitted

There are times between seasons when such a staple thing as a Bread Mixer can be advertised; so, too, with Cobbling Sets and Sad Irons. House cleaning season does not necessarily imply that women restock their kitchen or laundry pantry with new things. Then why not adhere to tools and simple necessities that concern the growing things of spring, which demand attention and care with the proper tools?

The "copy" shows wide awake management on the part of its owner. It proves that the firm refuses to let Sporting Goods trade go unsatisfied or elsewhere. It shows Camera Sundries are recognized as profit bringers. It evidences the fact that Seed buyers are welcomed at that store. Having these side lines, it is certain that it has others. Side lines of stock are very important things to a Hardwareman, and he who is callous to that fact overlooks good, profitable opportunity.

Side Lines

1905. VOLUME 43. NUMBER 23

MANCHESTER HARDWARE CO

48 Years Near the City Hall.

Close observers notice we advertise QUALITY, QUALITY, QUALITY. We have found out that it pays to furnish the best at reasonable prices, even if we sacrifice a little at first onour profit. The price is forgotten long before the quality is. The result—you come again.

READY MIXED HOUSE PAINT

HARRISON'S TOWN and COUNTRY PAINT is quality first, price afterwards. What is a few cents added to a gallon of paint if the quality admits its long life. Hence, this paint has lived 123 years. Brightest in color, longest in wear, economical in spread, cheapest in the end.

Our price is—
Gallon can.....$1.75
Half gallon can.....90c
Quart can.....50c

If ordered sufficient to paint a house, deduct 10 cents per gallon. If in 5-gallon bucket, less 5 cents additional.

M. H. CO. COTTAGE PAINT is the equal to any other paint, except Town and Country. It is used where absolutely the best is not required.

Our price—
Gallon.....$1.30
Half gallon.....70c
Quart.....40c
Pint.....20c
Half pint.....12c

Same discounts on quantity and larger containers as above.

JAP-A-LAC brightens everything it touches, gives lustre to furniture, refrigerators and floors.
Cans—15c, 25c, 40c, 75c.

REFRIGERATORS — The Baldwin and Eclipse, made in good old Vermont, honest ice boxes, ice savers, easily cleanable, positive air circulation, sanitary—$8.00 to $30.00.

OUR SEED DEPARTMENT is a busy place now. Our seeds have always been noted for their reliability. Customers ask for the same as last year.

Flower bulbs—
Peonies, 20c each.
Dahlias; bunch, 10c.
Cannas, 5c each.
Tuba Roses, 2 for 5c.
Gladioli, 2 for 5c.
Crimson Rambler Rose Bushes, 25c.

Natives on their own roots, not the cheap grafted kind on wild roots.

LAWN SEED from our own formula, the correct mixture for this climate, makes a fine velvety sward
Per pound.....20c

Hexagon mesh GALVANIZED WIRE NETTING, each roll has 150 running feet length.
Per roll—
12 in. wide.....$ .83
18 in. wide.....1.24
24 in. wide.....1.65
36 in. wide.....2.47
48 in. wide.....3.30
60 in. wide.....4.12
72 in. wide.....4.95

Five rolls each, or assorted, 10 per cent discount. Freight prepaid.

UNION LOCK NETTING.
Each roll 150 feet:
48 inch.....$4.12
60 inch.....4.80
72 inch.....5.40

BREAD MIXERS—$2.00.

SHOVEL, HOE, RAKE, best quality cast steel, full size; the combination price is only

$1.25

SCREEN DOORS, 3 panel, ⅞ inch thick, ornamental style, 4 sizes, including fitting—$1.25.
Heavier Doors, 1¼ inches thick—$1.50

COBBLING SETS, as illustrated—75c.

RUBBER GARDEN HOSE

Whirlpool brand—
½ in., with coupling: foot..9c
⅝ in., with coupling: foot..11c
Acme brand—
½ in., with coupling: foot..8c
⅝ in., with coupling: foot..9c

WAGON UMBRELLA, 32 inch, green drill—$1.00.
BUGGY UMBRELLA, Bent Standard, tan, with fringe—$4.50.

Base Ball Supplies and Outfits

We furnish suits from 97c upward.

BROWNIE CAMERAS—$1.00 and $2.00

DRY PLATES and FILMS and PAPERS received bi-weekly; insuring fresh goods in the leading standards. We develop and print in our dark room.

RUBY LAMP, regular $1.00 quality; price—50 cents.

HOSE REELS—75c, $1.00

BEST GRADE WIRE CLOTH

BLACK WIRE FLY NETTING, all widths 18 to 44 inch, in full rolls, $1.25 per 9'd sq. ft. Each roll is 100 running feet.

Price cut to measure per yard—24 in., 10c; 30 in., 10c; 32 in., 20c.

MRS. POTTS'S SAD IRONS: per set.....$1.00

We have Dog Furnishings of every description: Anti's and Old Grist Mill Bread. Dr. Glover's Remedies. Fine line of Collars, Leads, Whips, Chains and Muzzles.

The "PITTSBURG PERFECT" WIRE FENCE, small mesh at bottom, increases in size at top, joints electrically welded, cheapest and best; if not, why do the railroads use it? You can fence a lot for 30 cents a rod in high fence.

MANCHESTER HARDWARE CO

The progressiveness of the Manchester Hardware Company is our chief conviction after reading its advertisement. It realizes that other stores carry goods which a Hardware store is the logical distributer of. Therefore it takes great big space to warp that trade back into its rightful channel. It is surprising, to close observers of advertising, how an advertisement will lead people by their very noses to the store of an advertiser. Needs of which folks are not aware come into mind when an advertisement is read. Men make the money, women spend it, and all publishers feel it to be bounden duty to show where money can be spent.

Leading People

The Manchester Hardware Company should be congratulated upon its splendid service to the people of its town. Its example should be suggestive to advertisers among the trade.

Criticism No. II.

From a Hardware merchant in Minnesota who has adopted very successful methods in advertising his store we have the following criticism of the advertisement in question:

It is an excellent advertisement. By that I do not mean that it is perfect, but that it is near enough to the perfect line to deserve recognition and praise from all those who are interested in the betterment of the average run of Hardware advertising. The comment that accompanies each cut is short and crisp and ought to attract and hold the attention of any one who is in the market for any of the goods advertised.

To me, the strongest part of this ad. is the prices that are quoted. I do not mean that they are low, but the fact that the price is advertised makes the ad. a strong one. Take the descriptive matter connected with the cut of hexagon fencings, for illustration. It gives the widths of fence carried and the cost per roll of 150 feet and what more could the most expert salesman say about it? And when an ad. covers the ground as completely as that it's a spanking good ad. It is an impossibility to be as explicit in their talks about some of the other lines, but enough is said to interest one, and that is the chief duty of a good ad. The firm name might have been omitted either from the top or bottom of the ad.—once is enough.

Spanking Good Ad.

Top or Bottom

I am not advised of the original space the ad. occupied, but it ought not to have been less than three columns wide and a column in length. I want to congratulate the writer of this ad. upon having produced what to me is a business getting piece of publicity.

POSTAL CARD CIRCULAR.

A PHILADELPHIA Hardware firm recently sent through the mails a postal circular the announcement side of which is reproduced herewith. The dimen-

FOR TWO ONE-DOLLAR BILLS
OR ONE TWO-DOLLAR BILL
WE WILL SELL YOU
One Hundred Pounds
of strictly A No. 1
Cut, or Wire Nails
either 20, 30, 40, 50, 60 penny
AND WILL PROVE IN A GOOD KEG
Our prices for other sizes are just as near "right"
as you will quickly discover if you
"WRITE"
J. B. SHANNON & SONS
816 Chestnut Street
Philadelphia

Postal Card Circular, Reduced from 6¾ by 5 Inches.

sions of the card were 6¾ x 5 inches. The background of the card, which appears black in the reproduction, was dark green, the hands being something approaching a light tan color. The card, which was gotten up by Francis I. Maule, 402 Sansom street, Philadelphia, will be recognized as an effective one, and the announcement which it carried doubtless commanded the attention of those who received it.

AN EFFECTIVE WINDOW DISPLAY.

A VIEW of a window display which Inscho & Inscho, Hardware merchants, Tioga, Pa., found very effective in attracting public attention and opening the

public's purse during its continuance is given herewith. The attractive fire place was made of boards with brick paper pasted over them. Entrance to the window was from the back of the fire place, through two doors hung on hinges. The articles exhibited comprised Skates, Sleds, Jack Knives, Carving Sets, Rifles, Revolvers, Carpet Sweepers, Copper Nickel Plated Ware, Aluminum Ware, Dollar Watches, &c. The firm considers the show window, especially when coupled with live and enterprising newspaper advertising, as of very great value in bringing goods to the attention of buyers, and takes pains to make its windows timely and interesting.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Reforming Business Methods.

Criticising a part of a serial article in our issue of April 27, we have the following forcible letter from a well-known retail house in Iowa:

Referring to the article "A Manufacturer's System in the Marketing of Goods," in your issue of April 27, we are not customers of the "Paton, Belknap Company," and so have no right to call in question its business methods. Possibly, too, the patrons of this company are satisfied with its "Postal Card Acknowledgment" and to know that goods (ordered perhaps in a great hurry, sale perhaps depending on prompt arrival) "will be shipped soon as possible"—next week, next month, any old time, subject to strikes, accidents or the judgments of God.

Such "acknowledgments" may pass as business methods in the effete East, but the "wild and woolly" are impatient of methods that inform us only that order has been received, that it will have "prompt and careful attention"—whatever that may mean—or will be "shipped soon as possible."

The case is more aggravated still when the overworked office boy forgets to date his postal or refers vaguely to "your valued favor of recent date."

It seems to us the courtesies of business and the rights of the other fellow demand a reform of such "business methods."

THE R. BLISS MFG. COMPANY, Pawtucket, R. I., advises us that it is not intending to make any changes in its plant, the reported enlargement, as per the daily press, being entirely unfounded.

FACTORY COST AND BUSINESS METHODS.

A MANUFACTURER'S SYSTEM OF RECORDING PURCHASES.

F. E. Wells, Greenfield, Mass., has employed for some years a simple system of keeping track of stock purchases. He originated the method while with the Wells Bros. Company, Greenfield, and now employs it at the F. E. Wells & Son Company's shop in the same town. A loose leaf book is employed, sample pages of which are

Miscellaneous Articles S.

Article	Quotation by	Rec'd	Rec'd	Ord.	Ord.	Terms
Set collet Discs. (Geo. Heath)	Hambridge Bros	3/23/05		3/21/05		Net 30 days
12" dia 1/2" thick.	Boston, Mass.					
For Gardner Grinder						
Steel Special	Hambridge Bros	3/29/05		3/29/05		
3/8 x 5" wide	Boston Mass.					
Punch for bending Eye Bolts						
Stapler	S. Allene Steel Town					

Fig. 2.—Loose Leaf Record of Quotations and Orders for Miscellaneous Articles.

here shown, Fig. 1. From this record it is an easy matter to refer to former purchases when there is need of new stock. If a traveling man calls it is easy to learn if there is a sufficient stock of his lines in the shop, because, as Mr. Wells states, the law of averages works very well in this, and even without reference to the stockroom it is pretty safe to trust to the purchase book. Track is kept of quotations by different houses and at different times by the same house, which is important when buying. Of course, in keeping track of stock on hand such a system cannot be exact, but Mr. Wells has found it ample for the conduct of his several business interests. The opposite page in the opened book gives space for description of any article or class of articles, by size, list and purpose; quotations, discounts and terms, together with a full page for orders. It is the custom of the company to rule a red line at the end of each year in the order columns.

Drills Straight Shank Jobbers Length

Size	Last Price	Description	Quotation by	Date Rec'd	Date Rec'd	Date Rec'd	Date Rec'd	Terms	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.	Ord.
1/32	per doz 1.00		Kommerlen Schlemmer Co	3/9/05 65-10%				30 days Net	3/15/05 1 doz													
3/64	1.00		New York Duty						3/44													
1/16	1.00	Spiral Center Drills	Peter A. Frasse & Co	3/1/05 65-10%				30 days Net	1/16	3/15/05 1 doz	3/31/05 1 doz											
5/64	1.10		New York Duty						5/64													
3/32	1.20		Montgomery & Co	3/10/05 65-10%				30 days Net	5/32	3/31/05 1 doz												
7/64	1.30	Rivet Hole #0 Dia	New York Duty						7/64	4/21/05 1 doz	4/21/05 3 doz											
1/8	1.45								1/8	3/31/05 2 doz												
9/64	1.60	Rivet Hole #2 Dia							9/64	3/31/05 1 doz	4/21/05 2 doz	3/31/05 3 doz										

Ordered

Fig. 1.—F. E. Wells & Son Company's Loose Leaf Record of Stock Purchases.

USE OF CONTRACT SYSTEM BY F. E. WELLS & SON CO.

THE F. E. WELLS & SON COMPANY, Greenfield, Mass., manufacturer of Dies and Pipe Cutting Machines, employs job work to a considerable extent in its shop, and to excellent advantage. The contractor employs his own men, but they are paid direct by the company, which thus stands between the contractor and his helpers. The contractor receives a given price per piece, according to the usual custom in contract work. The price, however, is made to include raw materials as well as labor, while the company furnishes the machinery and power. Every item of material that goes into the product is charged up to the contractor. He pays for all stock, even for the oil that is used in the machines that he employs to do his work. His contract price per piece is on this basis, and he receives as his earnings the difference between the total price agreed upon between him and the company for the work he produces, and the total of the cost of his raw materials and his pay roll. By this system the contractor is held strictly accountable for all loss of raw material in process of manufacture, and the cost system of the company is greatly simplified. An interesting feature of the tool room is the storing of oil in 1-gallon cans, which are dispensed to the contractor, who is charged for the full gallon. One important advantage of the system is that it tends to economy in the use of everything.

THE CONVENTIONS AT VIRGINIA HOT SPRINGS.

ARRANGEMENTS are about completed for the simultaneous conventions of the Southern Hardware Jobbers' Association and the American Hardware Manufacturers' Association at Hot Springs, Va., June 6-9. Hotel reservations at the New Homestead have already been made for more than 500 persons, and it is thought that fully 700 will be in attendance, including manufacturers, jobbers, traveling salesmen and ladies. The representation of the fair sex promises to be larger than at any previous Southern convention. The railroads have granted a one-fare rate for the round trip from all points south of the Ohio and east of the Mississippi rivers. From all other sections the rate will be fare and a third for the round trip on the certificate plan.

C. B. Carter, Knoxville, Tenn., secretary of the Southern Association, will be pleased to hear from all those manufacturers, jobbers and others who are intending to be present at the conventions and have not yet notified him to this effect, so that their names may be placed in the attendance book and properly numbered badges provided.

The Programme.

While the programme for the meetings has not yet been entirely completed, a general outline of the work mapped out for them has been prepared. Among the topics which will be discussed at the jobbers' executive sessions will be "Restricted Prices," which will be the subject of a paper by W. W. Webber of the Webber-Ayers Hardware Company, Fort Smith, Ark.; "Increasing Expenses *vs.* Decreasing Profits," introduced in a paper by R. M. Dudley of the Gray & Dudley Hardware Company, Nashville, Tenn.; "How to Enforce Uniform Terms," and "Mutual Fire Insurance in the Southern Hardware Jobbers' Association." There will be several joint sessions in which the manufacturers will participate, and at which formal papers will be read, as follows: "Freight Matters of Interest to Manufacturers and Jobbers," by E. B. Pike, Pike Mfg. Company, Pike, N. H.; "Where Are We At?" by W. P. Smith, Mead & Smith, Rogersville, Tenn.; "Advantages and Opportunities Afforded by the South for Manufacturing," by Harry Wise of the *Tradesman*, Chattanooga, Tenn. A well-known traveling salesman will also contribute some "Observations."

Entertainment Features.

The entertainment of the associations and their guests will be in the hands of a very efficient reception committee, which will doubtless make the social side of the gathering as interesting and attractive as usual, which is saying a good deal. A banquet has been determined on for Tuesday evening, June 6, at which Judge Taft, Secretary of War, will be a special guest.

CONTENTS.

PAGE.

The Works of the Birdsboro Steel Foundry and Machine Company. Illustrated....1505
Notes from Great Britain....1509
The Nutter-Barnes Cutting Off Machine. Illustrated....1510
Powdered Coal for Cement Kilns....1510
Testing Machine for Lubricating Oil....1510
Motor Drive on a Cincinnati Twenty-four-Inch Shaper. Ill.1511
The Manhattan Bridge....1511
Air Blast for the Foundry Cupola....1512
The Imico Union for Steam Piping. Illustrated....1513
The Kenworthy Hardening and Tempering Furnace. Illus.1513
Phenomena of Machine Operation....1514
Shipbuilding for Foreign Account....1516
The Laffitte Welding Plate. Illustrated....1517
Central American Notes....1517
Laidlaw-Dunn-Gordon Gas and Electric Driven Air Compressors. Illustrated....1518
The Carolina Tin Belt....1519
The Gayley Dry Air Blast....1520
The Henry W. Oliver Estate....1521
The Philadelphia Foundrymen's Association....1522
A Nine-Inch Motor Driven Star Lathe. Illustrated....1522
Incandescent Gas Lighting....1523
The Mining Engineers....1524
Pacific Coast Transportation Interests....1527
Editorial:
The Iron Age Directory....1528
Unsatisfactory Trade Relations with Cuba....1528
The British "Stop Day" Case....1528
The Crane Age....1529
The Condition of the Iron Trade....1529
Cheaper Alcohol for Manufacturing Purposes....1530
Core Binder Tests....1531
Lake Superior Mines Sold....1532
Personal....1533
Pig Iron Production Slightly Increased....1534
New York Pig Iron Warrant Market....1535
News of the Works:
Iron and Steel....1535
General Machinery....1535
Power Plant Equipment....1536
Foundries....1536
Bridges and Buildings....1536
Fires....1536
Hardware....1536
Miscellaneous....1536
Trade Publications....1537
The Iron and Metal Trades:
A Comparison of Prices....1538
Chicago....1538
Philadelphia....1540
Cincinnati....1541
Birmingham....1541
Pittsburgh....1542
Cleveland....1544
The Appraisement of Imported Merchandise....1544
A Power House at Joliet....1544
The Hastings Tunneling Shield System....1545
Metal Market....1546
New York....1546
Panama Canal Machinery Found Available....1547
The Machinery Trade:
New York Machinery Market....1548
New England Machinery Market....1550
Chicago Machinery Market....1550
Cincinnati Machinery Market....1551
Philadelphia Machinery Market....1552
Government Purchases....1553
Iron and Industrial Stocks....1554
Hardware:
Condition of Trade....1555
Notes on Prices....1555
Requests for Catalogues, &c....1557
Price-Lists, Circulars, &c....1557
Among the Hardware Trade....1558
Landers, Frary & Clark's New Quarters....1559
Death of Virgil P. Humason. Portrait....1559
Sedgwick Machine Works....1559
Yale & Towne Mfg. Company's New Chicago Store....1559
Trade Winning Methods. Illustrated....1560
Letters from the Trade....1561
Factory Cost and Business Methods. Illustrated....1562
Use of Contract System by F. E. Wells & Son Company.1563
The Conventions at Virginia Hot Springs....1563
Address of Col. J. R. Nutting Before the Senate Committee....1564
Trade Items....1564
British Letter....1565
Challenge Cutlery Corporation....1565
Miscellaneous Notes:
Babcock's Portable Display Rack....1565
Wheeling Galvanized Tubs and Buckets....1566
Bradley & Hubbard Mfg. Company's New Lamps and Art Goods....1566
Adjustable Barrel Support. Illustrated....1566
Orient and Imperial Designs. Illustrated....1566
Lowrie Combination Safe and Lock. Illustrated....1567
Improved Wire Cushioned Oil Can. Illustrated....1568
Poultry Beheader. Illustrated....1568
Buckeye Folding Saw Vise. Illustrated....1568
Metal Window Screens. Illustrated....1568
Stevens Double Barrel Gun No. 225. Illustrated....1569
Headson Pipe Wrenches. Illustrated....1569
Current Hardware Prices....1570

ADDRESS OF COL. J. R. NUTTING BEFORE THE SENATE COMMITTEE.

THE following is the argument of Col. J. R. Nutting of Sickels, Preston & Nutting Company, Davenport, Iowa, and Sickels & Nutting Company, New York, before the Senate Committee on Interstate Commerce, to which was referred the Esch-Townsend bill, with its provision for the Governmental determining of freight rates:

There are many objections to conferring power upon any man, or committee of men, no matter how or by whom they are selected, to make arbitrary rates for the transportation of freight in all localities, under all circumstances, throughout this vast country. Conditions vary so much and the sudden changes in these conditions are so frequent as to make it, in my judgment, utterly impossible to determine any basis for making tariff schedules that will be just to all classes of our people.

There are now in use many classifications of freight which would have to be abolished and a new classification made that would govern everywhere in this land. In adjusting this feature alone it would require the time of our most expert, experienced and practical railroad men for a very long period. While this was being done the commerce of the country would be thrown into a chaotic condition which would greatly interfere with commercial transactions and possibly bring on a stagnation in business circles that would lead to the most unparalleled and deplorable financial panic ever known in this or any other country.

In arranging the one classification to take the place of the many now in use, the committee must take into consideration every article now produced or to be produced, bought and sold, all seasons of the year, and under all circumstances. The committee will confront the old States right question, which has cost so much money, misery, suffering and human lives. While you may confer certain power on your Interstate Commission, you cannot interfere with present laws or regulation of transportation of freight within the boundary of any State. Your classification and your schedules of freight rates could, and doubtless would, be ignored to the extent of billing within a State to the boundary line of another, and again rebilling from that boundary line to another. There may be difficulty in compelling two or more lines to make joint billing.

Should the Interstate Commerce Committee decide to make the new rates on a distance tariff basis, and there seems to be no other practical basis upon which they can make them, it would result in great hardship to the Middle West, and the important distributing centers would be greatly injured and might ultimately lose the prestige they now enjoy in the markets of the world.

The new rates in order to become popular with the masses must necessarily be reduced, and there is great danger that their reduction in revenue to transportation companies would result in inferior service, which would be greatly deplored by all classes of shippers, especially live stock.

The cost of constructing and operating railroads in different States varies materially. My friend Simmons would hardly be satisfied with a freight rate from Denver to the top of Pike's Peak that doubtless would be acceptable to the Chicago & Northwestern Railroad from Waukegan to Kenosha. Climatic conditions, variations in cost of labor and also in the salaries of skilled operatives and competent railroad officials cannot be computed by figures. National, international and State waterways would be a very serious matter, but must be considered. Water rates cannot legally be made and enforced, and even if they could, the goods to be transported on them are liable to be, and frequently are, owned by the party who owns the crafts that convey this freight.

Notwithstanding all these objections, and the foregoing mentioned are but a few of them, if you should decide to confer this power on the present Interstate Commission, or any other committee, it would certainly be conservative, and in my judgment the part of wisdom, to ask the commission who are to make these changes to arrange the schedules after consulting with the representative shippers, commissioners of the different States and transportation companies before conferring this power—a power which you will doubtless concede, as proposed to confer on the commission under the provisions of the Esch-Townsend bill, the greatest commercial power ever conferred upon any body of men, and it seems only fair and just that the people of this country should have some idea how such a change would affect their interest before such legislation is carried into effect.

TRADE ITEMS.

THE GARVER HARDWARE COMPANY, Des Moines, Iowa, will erect a new building for its own use. The general contract calls for a six-story structure, 67½ x 133½ feet, mill construction, with steel sash and frame. The building will be equipped with two elevators, passenger and freight, and provided with a light and power station.

CHARLES FREUND has been appointed manager of the Palace Hardware House, Erie, Pa., in place of H. P. Weller, who has resigned and will engage in another line of business. Mr. Freund has been connected with this store for many years and is well known to the Hardware trade in Pennsylvania and Ohio, having traveled for some years for the American Iron & Steel Mfg. Company, Lebanon, Pa.

THE printed report to the effect that the Eaton, Cole & Burnham Company, Bridgeport, Conn., has been absorbed by the Crane Company of Chicago has been officially denied at the New York office of the former company, which has recently materially enlarged its plant. An official of the Eaton, Cole & Burnham Company is authority for the statement that an agreement has been made by the two concerns whereby some of the Crane Company's product will be manufactured at Bridgeport, but the management of the two corporations will remain distinct and separate.

W. M. TAUSSIG, president of Wiebusch & Hilger, and also of the Challenge Cutlery Corporation, sailed for Europe May 10 on the steamship Oceanic, to be gone until July 10. His trip abroad will be a combination of business and recreation.

SURPLESS, DUNN & Co., 55 Warren street, New York, manufacturers' agents, having wide connections, with Chicago branch at 68-70 South Canal street, have taken new and much larger quarters at 74-76 Murray street. This change was necessitated, we are advised, in consequence of the great increase in their business.

CHARLES S. GRIEVES AND JOHN G. W. GRIEVES, Amesbury, Mass., who are putting on the market the Common Sense Adjustable Appliance for Carpenters' Brackets, have formed a stock company known as the Grieves Bros. Company. At present the Appliance is made for them by another company, but it is planned to establish a plant for its manufacture later on.

THE PITTSBURGH RIVET COMPANY, Pittsburgh, has purchased the plant formerly operated by the Eclipse Mfg. Company, near Thirty-eighth street, in that city, and will operate it in connection with its own plant at Penn avenue and Thirty-second street. The company reports a very large demand for Rivets, Bolts and upset work.

DOSITHE P. PATENAUDE, for more than a quarter of a century a resident of Helena, Mont., and prominently identified with its business affairs, died on the 3d inst. at San Diego, Cal., where he went more than two months ago in the hope that the change of climate would restore him to health. Mr. Patenaude was a native of Canada and was 47 years old. He went to Helena 26 years ago and at once secured employment with the A. M. Holter Hardware Company, with which he continued until his death, having been general manager of the business for a number of years.

GLOVER BROTHERS, Hardware merchants, Baltimore, Md., whose store was destroyed in the memorable conflagration, and who have since occupied temporary quarters, have recently taken possession of a new store at 324 Light street, where they are now comfortably settled.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., April 29, 1905.

The Week's Hardware Trade.

THE prospect for the immediate future is better than for some time past. The various branches of the engineering trade are fairly well supplied with work, and a larger volume of employment is assured. There has also been a good demand for Machine Tools, Stamps and Presses, and this greater briskness is of course reflected in a larger demand for foundry irons and special qualities of steel. Cycle makers have been and are likely to remain for a time exceedingly busy now that the selling season has opened with some promise, while local Motor Vehicle manufacturing firms are occupied at full pressure. Rolling stock makers also have substantial contracts on hand for export, especially to some of the South American States, whose prosperity still continues to grow. The demand for Wheels, Axles and Springs, both for road and rail vehicles, has been correspondingly good, so that in this branch of industry very fair conditions prevail. There has been a marked improvement in the brass trade as a whole, not only in Birmingham but throughout the country, which makes the change seem all the more promising. A measure of the improvement is furnished by the returns of the Brass Workers' Trade Union. The branches throughout the country have ceased to draw on balance on the central funds of the society, which they were doing rather heavily in the winter months, while locally out of work payments have declined about 50 per cent. These are very satisfactory conditions of course, but they do not prove that the trade is entirely without fault from the manufacturers' point of view. There is still room for a considerable expansion of business, and the state of the copper market is not any more favorable.

Owing to the depression in the Cutlery trade there is still a small demand for Hafting materials. As the sums obtained at the London ivory sales show, high prices continue to rule the ivory market. The American merchants did not purchase largely, but there was plenty of competition among Continental and home buyers. But notwithstanding the high prices Sheffield representatives bought freely, considering the state of trade and the hesitancy to accumulate large stocks. The horn trade is very little better than that for ivory, but the Continental export trade for tips, mouthpieces for pipes, &c., is better than it has been, and some good American orders are being received for horn Hafting material.

Export trade has been undergoing a gratifying expansion of late, especially the demand for iron and steel and various classes of Machinery. South America, notwithstanding the large increases recorded last year, maintains its position in this respect, and there is rather more vigor about the Australasian demand. Except for a few things, such as galvanized iron, South Africa remains a poor market, and India, although taking more railway rolling stock, permanent way material and Machinery, has been a much poorer customer for metal goods and Saddlery. China, on the other hand, has been absorbing large quantities of copper and also of yellow metal. The war, while checking trade with Russia, seems to have stimulated that with Japan. European countries have been taking rather more Machinery, and in some cases Hardware goods, from us, and in this direction also there has been a larger call for copper owing to the war requirements of Russia. Canadian preference and the dumping law combined seem to have opened up a better market there for Steel Rails, Sections and such like articles. Hardware and galvanized sheets also have been in greater demand.

The Legal Position of Price Maintenance.

I have repeatedly in these columns drawn attention to the importance of American proprietary articles being sold on the principle of price maintenance. The legal position is now fairly well assured. In a recent action Kynoch, Limited, the well-known Ammunition manufacturer, obtained an injunction restraining a Worcester Gun maker from selling its Bonax Cartridges at less than the fixed minimum retail price. This decision makes it clear that traders must adhere to the terms upon which proprietary articles are placed in their hands for distribution, even when those terms are expressed in the simplest and most practicable way—namely, in the form of a footnote to an invoice. Arthur Chamberlain, the chairman of Kynoch, Limited, who is not in favor of any interference with the prices of commodities that leaves the public out of consideration, welcomes this decision as entirely just and necessary. From an interview with him I extract the following:

Take the position of the retailer. Here is an article, we will say, which is presumably known to his customers as well as to himself. He cannot do more than any of his competitors can do in the way of supplying the public with that particular article Nevertheless, it is for the convenience of the public that the facilities of supply should be as widely distributed as possible. That being the position, any distributer who wants to give the appearance of selling cheaply without the reality has only to offer some particular proprietary article below the price at which it bears a fair profit in order to establish the reputation of being a cheap man, and then to take advantage of the reputation so made to sell at an exorbitant profit other articles the prices of which the public are not so well qualified to judge.

This man may be, and often is, very little interested in the distribution of the particular proprietary articles affected. They form only a small part of his trade. The cut in price, therefore, is not only a cut in that which forms the smallest part of his returns, but it is one which allows him to recoup himself on the larger part. But the effect of the cut on a neighboring tradesman who is doing a large business in the proprietary article in question is seriously to reduce his earnings.

It has come about that one cannot sell a proprietary article now except by one of three methods. First, one may advertise the article so extensively as to force a distributer to stock it in answer to the public demand so created, in which case the vigorous advertising has to be paid for partly by cutting the distributer's profits and partly by making the public pay more for the article.

The second method is to appoint certain agents and limit one's trade to them. By that means the facilities for the general purchase of the article by the public are curtailed and the prospects of sales are reduced.

Thirdly, and finally, one may adopt for the purpose of proprietary articles the principle of price maintenance and only sell to those distributers who are willing to adopt that principle and adhere to it.

Clearly the last method is the best, and is in the interests of all the parties concerned—the manufacturer, the distributer and the public. To the manufacturer it gives the widest possible field for the disposal of his goods. To the distributer it gives protection against unfair competition. To the public it gives the largest possible facilities for obtaining the article. That being so, and the principle being accepted between the manufacturer and the distributer, the only possible thing to do, if some one breaks the agreement he has entered into with his eyes open, is to call in the assistance of the law.

The case just decided is a very important one from that point of view, and I think the judgment may prevent the necessity for further cases of the kind being carried into court. It will now be understood that such a price maintenance contract as that made by Kynoch, Limited, is a definite and binding one and cannot be broken with impunity.

The public need not be afraid of suffering from exorbitant prices, because there are the stores and other great wholesale distributers ready to come in wherever the public find the retail distributer unreasonable. But, as a matter of fact, the public in many instances requires and prefers the personal attention of a man educated to his business, interested in it, and willing to take trouble in order to please his customer, and for that the public must be willing to pay. It is not fair that a single man should disorganize the whole trade of a town by a reckless cutting of prices.

CHALLENGE CUTLERY CORPORATION.

THE CHALLENGE CUTLERY CORPORATION, Bridgeport, Conn., has increased its capital stock from $100,000 to $150,000. Plans have been adopted and contracts signed for an entire rebuilding of the plant, which is devoted exclusively to the manufacture of Pocket Knives and Razors. The new plant will be of the latest and most modern mill construction, including features that relate to the comfort and convenience of employees. The work will be pushed so as to have the plant occupied by fall and at the same time in no way interfere even for a day with current production. The company will have its own electric generators for operating the plant.

MISCELLANEOUS NOTES.

Babcock's Portable Display Rack.

E. B. Babcock, Seattle, Wash., formerly located at Salt Lake City, has supplemented his portable axe, edge

tool and steel goods display rack, which was illustrated in the *The Iron Age* of July 7, 1904, with a device for holding and displaying scythes and grass hooks, which in no way interferes with or obscures the other goods. The rack shows 250 pieces of goods at one time, bringing out the individuality of each article, and occupies a floor space of 24 inches. The goods which may be shown at one time include boys' and men's handled axes, unhandled axes or sledges, striking hammers, masons' hammers, wedges, adzes, scythe stones, grass hooks, weed, grass or bush scythes, forks, hoes, rakes, brooms, mop sticks, fork handles or goods of like nature, as well as horse whips.

Wheeling Galvanized Tubs and Buckets.

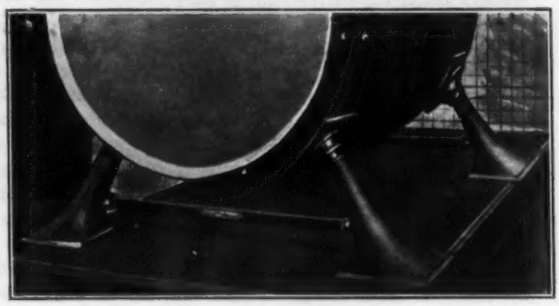
The Wheeling Corrugating Company, 47-51 Cliff street, New York, is making at its Martins Ferry, Ohio, plant a line of Wheeling galvanized tubs and buckets, which are an entirely new product with the company. The tub sizes are 18, 20, 22 and 24 inches in diameter at top and numbered, respectively, 0, 1, 2 and 3. The sizes are stamped on the bottom of each tub and bucket or pail, special mention being made of the claims that the goods are well galvanized; that nested shipments will not stick, and that the goods are guaranteed in every detail. The tubs have movable iron boiler handles, and, if wanted to take a wringer, a wrought attachment can be supplied by the company to permit this being done. The pails or buckets with bails have the same general characteristics except in shape, and are made in 8, 10, 12 and 14 quart sizes. A feature of both lines is said to be the low price at which they are sold.

Bradley & Hubbard Mfg. Company's New Lamps and Art Goods.

Bradley & Hubbard Mfg. Company, Meriden, Conn., and 21-23 Barclay street, New York, has now on exhibition in its New York showrooms an elegant display of new lamps and art goods in addition to standard lines. In reception lamps, unique in shape, taking decorated shades 10 and 12 inches in diameter, are finishes in old brass, Colonial brass and Corinthian brass. In electrical candelabra, Colonial brass finish, is a three-light piece with cut glass shades. Another example is a piece with decorative art, leaded glass shade, cone shaped, Russian bronze finish. In electric portables or reading lamps are some with art glass in umbrella effect; others in Mission and Art Nouveau designs. One striking pattern is a two-light electric lamp with leaf work, Art Nouveau effect. In art metal work, all new, are smokers' sets in great variety of styles and finishes, while in book slides a full and attractive line is shown. These goods have ends that fall inward a quarter of a circle when not in use, one new style having ends 6 x 7 inches, of bronze, with busts of standard authors. Ordinarily they have a capacity of 13 linear inches. By means of slides this can be expanded to 23 inches. There are likewise many others just brought out in cast brass in various finishes, some solid end and others in open work.

Adjustable Barrel Support.

The barrel support shown in the accompanying cut consists of four substantial cast iron legs, to the upper end of each of which is attached a saddle on which the barrel rests. Each saddle is connected with the legs by a ball bearing joint, permitting it to move in any direction, and thus to adjust itself to any size or diameter of barrel. The support is designed for use in connection with oil, varnish, turpentine, molasses, vinegar, cider or whiskey barrels and is adapted for use in retail stores or warehouses. The device has recently been brought out by the L. Schreiber & Sons Company, Cincinnati, Ohio.



Adjustable Barrel Support.

Orient and Imperial Designs.

The International Silver Company, at Factory C, Bridgeport, Conn., formerly the Holmes & Edwards Silver Company, has recently brought out two new designs in silver plated table flat ware, as here shown. Fig. 1 represents the Orient pattern, which is furnished in the various spoons, forks and knives as well as the numerous fancy pieces, in either bright or French gray finish. This pattern, while heavy, is neither bulky nor clumsy, and is burnished entirely by hand. It is furnished in rolled plate quality only and guaranteed for ten years' wear. Articles of this pattern can be supplied in 12 ounce or triple plate and XIV or sectional plate. Fig. 2 illustrates the Imperial design, made also in standard and fancy pieces in both bright and French gray finishes. This style is inlaid with sterling silver in back of bowl and handle before plating and the fancy pieces are in special XIV plate. The Imperial style is made only in sterling silver inlaid quality, is guaranteed for 25 years and will be replaced by the company if it shows wear during the term of the guarantee.

Fig. 1.—Orient Design.

Fig. 2.—Imperial Design.

Lowrie Combination Safe and Lock.

The Lowrie Safe & Lock Company, 1106 Flatiron Building, New York, is manufacturing a group of small safes, unique in style, size and place of installation, some of which are here illustrated. Fig. 1 reproduces a leading

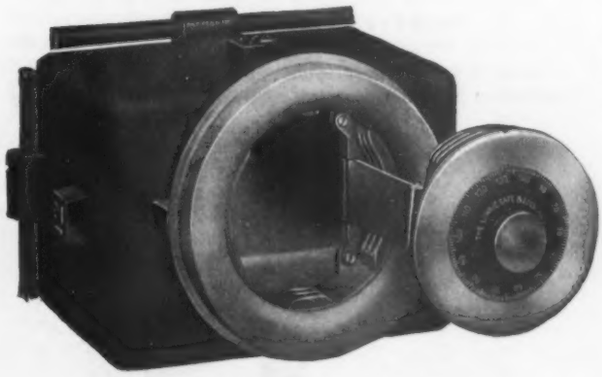


Fig. 1.—Lowrie Wall Safe and Combination Lock.

kind, especially designed for permanently building into walls in residences, apartment houses, office buildings, hotels and wherever a receptacle for small valuables in frequent use is required. The feature of this construction is the combination locking mechanism, which, as more clearly indicated in Fig. 2, is simply hung on a two-hinged steel arm, which when unlocked throws the door

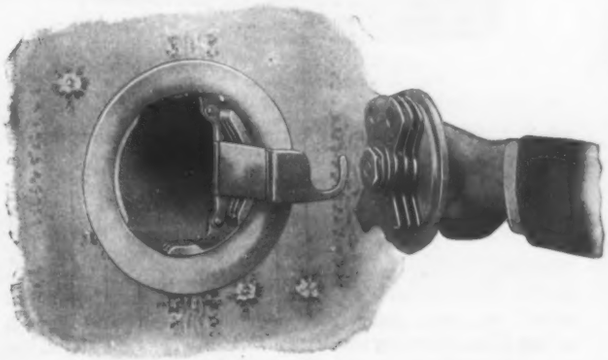


Fig. 2.—Showing Accessibility of Lock and Appearance in Wall.

with dial and lock forward and to right out of the way. When so exposed the combination principle can be quickly grasped, so that the existing combination can easily be changed without in any way impairing the security. In hotels and apartment houses the proprietors and managers can change the combination with the arrival of each

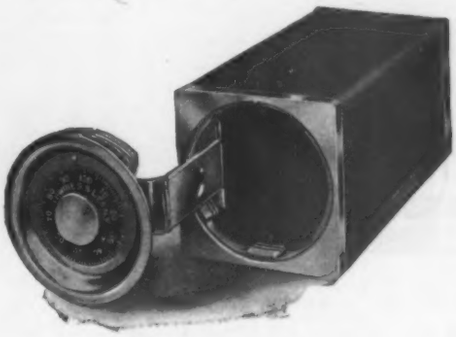


Fig. 3.—Document Safe.

guest or new tenant and the individual can again alter it if so minded. For building into a wall the safe shown in Fig 1. is one of several types. It is made of heavy cast iron, with interior (enameled or bronzed) capacity of 7 x 7½ x 11 inches, the overall dimensions being depth 10 inches, hight 10 inches and width 14½ inches. The door, of 5-16 inch steel plate, is 6⅛ inches in diameter, fire proofed, with concealed hinge and anchoring rods. This size weighs 80 pounds and may be set flush with wall or project any distance up to 1 inch. While there are approximately 1,500,000 possible combinations, the user can alter the existing lock combinations by removing a stop screw in the innermost tumbler plate and replacing in any of four other holes. A new combination is obtained by revolving each plate, which is plainly seen, getting all three in alignment at top by means of notches in each, which in turn are aligned with the dial, and noting carefully the figures at which the dial stops in each of the three revolutions. There is also a safe of the same style

Fig. 4.—Jewel Case.

for a 16-inch wall, with inner capacity 10 x 9½ x 14 inches, weighing 160 pounds, but listing only $5 higher than the one described above. Safes of this same general style and character are likewise made weighing but 50 and 40 pounds, having doors 4⅛ inches in diameter of 3-16 inch steel plate, listing respectively $16 and $12 each. Interior push buttons can be provided to be switched on as desired, so that any manipulation of the dial will operate a burglar alarm installation. A thief trap is also made which has all the outward appearance of a safe, but which is merely the door and surrounding frame and is arranged with a push button as above described. Workmen during construction cannot tell whether it is for a safe or otherwise, nor can an intruder after the room is occupied. Other applications of the same principle, differing only in shape and finish, are made for use

Fig. 5.—Lowrie Combination Drawer Lock.

in connection with desks, trunks, dressing cases, &c. Fig. 3 illustrates a document safe for building into desks, closets, paneling, &c. The exterior is finely finished and interior lined with a soft material, the outer dimensions being 4¼ x 4¼ x 10½ inches. Fig. 4 shows a jewel case, with a soft lining in keeping with the character of the articles it is expected to guard, listing $6. It is 1½ inches high, 4½ inches from front to back and 5¾ inches wide, weighing 8¼ pounds. The cover is finished in nickel and the box black enameled, with delicate gold stripe ornamentation. This can be screwed to a drawer in dresser, for instance, through a long steel plate which is bent at right angles at the back to prevent drawer being removed, the nuts being tightened when the dial is open, all of

which is furnished. Others are made to let in flush in any wood work which a blotter or doily will conceal. Of a more elaborate character is a drawer for silver, the inner dimensions of which are 14 x 20 x 32 inches, weighing 500 pounds. It is self contained, has a series of soft lined drawers, the entire interior rolling forward on sheaves and track. Fig. 5 illustrates a springless drawer lock having over 200,000 combinations and working on the same principle. It is designed for drawers, small doors, safe deposit boxes, &c., which the owner or user can readily change ten times when open without dismantling or use of a tool. It lists at $1.50. A grooved jamb plate, with full instructions, accompanies each lock.

Improved Wire Cushioned Oil Can.

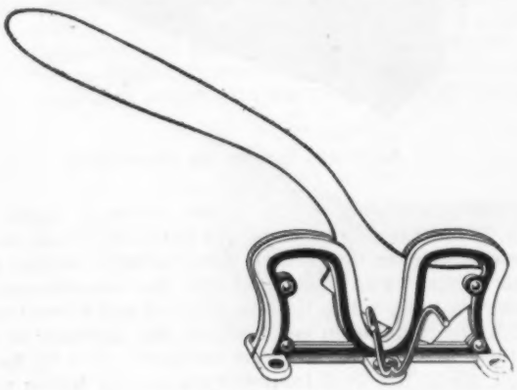
The 1-gallon cushioned glass oil can shown herewith is provided with heavy indestructible beaded tin rings

Improved Wire Cushioned Oil Can.

clinched tight to the coiled wire jacket. One ring is clinched to the bottom part and the other to the top of the wire jacket, this construction enabling the coiled cover to be removed from the can to facilitate the cleaning of either the glass or the jacket. Corrugated tin protects the bottom. The wire coils are all linked together and form an endless woven fabric. The cans are packed either one-half or one dozen per box, and are put on the market by Ohio Lantern Company, Tiffin, Ohio.

Poultry Beheader.

The device shown in the accompanying cut is designed for cutting off the heads of poultry instead of



Poultry Beheader.

wringing their necks or cutting them off with hatchet or axe. It is referred to as killing instantly, leaving the veins and arteries open, causing full and free bleeding, thereby leaving the flesh without discoloration. Among the advantages claimed for the beheader are that it is humane, practical and clean, and that the fowl's head is held securely, and the stroke of the knife is sure and quick. It is designed for use by farmers, poultry raisers, butchers, &c., and is put on the market by the Sun Mfg. Company, Columbus, Ohio.

Buckeye Folding Saw Vise.

J. B. Foot Foundry Company, Fredericktown, Ohio, is offering the folding saw vise shown herewith. It is

Fig. 1.—Buckeye Folding Saw Vise.

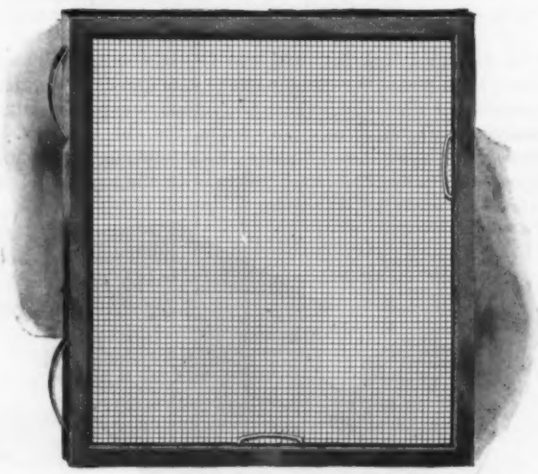
made of malleable iron throughout to secure strength and lightness. It folds, as illustrated in Fig. 2, compactly, occupying little space in a tool box. The jaws, which are 14 inches long, open and close instantly, by means of a

Fig. 2.—Buckeye Saw Vise Folded.

lever which holds the saw tight to prevent slipping or chattering.

Metal Window Screens.

Watson Mfg. Company, Jamestown, N. Y., has recently been allowed a patent on the all metal window screen composed entirely of nonrustable material shown in the accompanying cut. The screen works on the same



Metal Window Screens.

principle as the wooden frame screen which the firm has been manufacturing and will continue to manufacture. The advantageous features of the screen are referred to as follows: It is comparatively light in weight; the wire cloth is very smoothly and tightly stretched; the lifts are convenient and inconspicuous; in case of breakage of a spring it can be removed and replaced without the use of tools; and strength and durability.

Stevens Double Barrel Gun No. 225.

The accompanying cut represents the latest production of J. Stevens Arms & Tool Company, Chicopee Falls, Mass. It is alluded to as a popular priced shotgun of strong construction, and especially designed for high pressure powders. The frame and action are peculiar, in that the main springs are spiral and work on the plungers, which are set in the frame directly in front of the hammer to insure an easy and positive action. The gun has a check hook to take up all wear, top snap, low circular hammers, rebounding locks, solid plungers, American walnut stock, checkered pistol grip, regular length and drop, patent snap fore end and nitro steel barrels. The gun is made in 12 gauge, 28, 30 and 32 inch barrels, and in 16 gauge, 28 and 30 inch barrels, and weighs from 7 to 8½ pounds.

Stevens Double Barrel Gun No. 225.

Headson Pipe Wrenches.

Headson Tool & Mfg. Company, Lafayette, Ind., is introducing the wrenches shown in the accompanying cuts. The wrench illustrated in Fig. 1 is made of the best drop forged steel, machined and tempered, and has an inserted jaw in the handle which can be replaced.

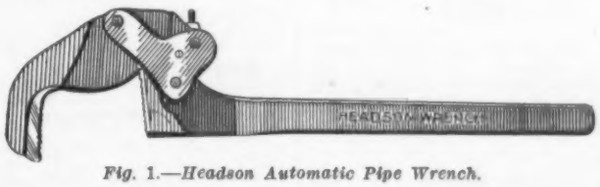


Fig. 1.—Headson Automatic Pipe Wrench.

Every part of the wrench is made interchangeable. It is automatic in operation, free from screw adjustment and adjusts itself instantly from ¼-inch wire up to 3-inch pipe. On large pipe, it is explained, instead of the jaws overhanging, the pull is equal on both jaws. The point is made that the wrench never slips, sticks or crushes, and that it is easily operated. To operate the wrench in the position shown, the handle is moved forward, and it adjusts itself to the pipe. To open the wrench the spraul, which is fulcrumed from a perfect center, is disengaged and the jaws open to the full size. The wrench is made in 14, 18 and 24 inch sizes. The chain tongs or wrench illustrated in Fig. 2 represents size No. 5, gripping 6-inch pipe. Among the advantages claimed for this tool by the maker are as follows: That it brings equal pressure immediately to bear on all the surface, that it will not mar or crush pipe; that it cannot slip; that it grips and releases itself immediately; that it is impossible to disconnect the links while in operation; that it is practically self adjusting and easily applied from one size of pipe to another, and that it can be used on flanged or beaded fittings. The tongs are made in eight sizes, with capacities from ¼ to 18 inches.

Fig. 2.—Headson Chain Wrench.

PAINTS, OILS AND COLORS

White Lead, Zinc, &c.—

	℔ lb
Lead, English white, in Oil	9⅛@ 9¼
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 6⅛
Lots less than 500 lb	@ 7
In Barrels	@ 6
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ½
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½
Lead, American, Terms: For lots 15 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	
	℔ lb
Lead, White, Dry in bbls	@ 6
Zinc, American, dry	4⅝@ 4¾
Zinc, French:	
Paris, Red Seal, dry	8¼
Paris, Green Seal, dry	9½
Antwerp, Red Seal, dry	7⅝
Antwerp, Green Seal, dry	8¾
Zinc, V. M. French, in Poppy Oil: Green Seal:	
Lots of 1 ton and over	11⅝@12¼
Lots of less than 1 ton	11⅝@12⅝
Zinc, V. M. French, in Poppy Oil: Red Seal:	
Lots of 1 ton and over	10⅝@10⅞
Lots of less than 1 ton	10⅝@11⅛

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	℔ lb
Black, Carbon	5 @10
Black, Drop, Amer	4 @ 6
Black, Drop, Eng	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	4 @ 6
Blue, Chinese	29 @32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.50@3.60
Green, Chrome, ordinary	3½@ 6
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	@ 6⅛
Lots less than 500 lb	@ 7
Litharge, American, bbls	6¼@ 6⅛
Ocher, American	℔ ton $8.50@16.00
Orcher, American Golden	2½@ 3½
Orcher, French	1½@ 2½
Orcher, Foreign Golden	3 @ 4
Orange Mineral, English	9 @10
Orange Mineral, French	10½@11¼
Orange Mineral, German	7¾@10
Orange Mineral, American	8 @ 8¼
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer	℔ 100 lb $0.50@1.25
Red Venetian, English	100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	1½@ 2
Talc, French	℔ ton $20.00@30.00
Talc, American	℔ ton 16.00@25.00
Terra Alba, French	℔ 100 lb 90 @1.00
Terra Alba, English	℔ 100 lb 90 @1.00
Terra Alba, American, ℔ 100 lb., No. 1	.60 @70
Terra Alba, American, ℔ 100 lb., No. 2	.45 @50
Umber, T'key, Bnt. & Pow	2½@ 3½
Umber, Turkey, Raw & Pow	2½@ 3½
Umber, Burnt, Amer	1½@ 2
Umber, Raw, Amer	1½@ 2
Yellow, Chrome	11 @14
Vermilion, American Lead	10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@66
Vermilion, English, Import	75 @80
Vermilion, Chinese	$0.90@1.00

Colors in Oil—

	℔ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	10 @15
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

Miscellaneous—

Barytes, White, Foreign	℔ ton $17.50@19.00
Barytes, Amer. floated	℔ ton 17.00@19.00
Barytes, Crude, No. 1	℔ ton 10.00@11.00
Chalk, in bulk	℔ ton 3.00@ 3.25
Chalk, in bbls	℔ 100 lb @ .35
China Clay, English	℔ ton 11.00@17.00
Cobalt, Oxide	℔ 100 lb 2.50@ 2.60
Whiting, Common	℔ 100 lb .43@ .48
Whiting, Gilders	℔ 100 lb .50@ .55
Whiting, Ex. Gilders	℔ 100 lb .55@ .60

Putty, Commercial—℔ 100 lb

In bladders	$1.70
In bbls. or tubes	1.05@1.10
In 1 lb to 5 lb cans	2.00@2.90
In 12½ to 50 lb cans	1.40@1.55

Spirits Turpentine—℔ gal.

In Oil bbls	60½@61
In machine bbls	61 @61½

Glue—

	℔ lb
Cabinet	11 @15
Common Bone	7 @ 9
Extra White	18 @24
Foot Stock, White	11 @14
Foot Stock, Brown	8 @11
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	9 @12
Medium White	14 @17

Gum Shellac—

	℔ lb
Bleached Commercial	30 @31
Bone Dried	41 @12
Button	36 @45
Diamond I	50 @52
Fine Orange	40 @45
A. C. Garnet	33 @35
D. C	65 @..
Octagon B	45 @50
T. N	31 @33
V. S. O	50 @52

Animal, Fish and Vegetable Oils—℔ gal.

Linseed, City, raw	48 @49
Linseed, City, boiled	50 @51
Linseed, State and West'n, raw	46 @47
Linseed, raw Calcutta seed	@60
Lard, Prime, Winter	56 @60
Lard, Extra No. 1	47 @48
Lard, No. 1	35 @39
Cotton-seed, Crude, f.o.b. mills	20½@21
Cotton-seed, Summer Yellow, Prime	26½@27
Cotton-seed, Summer Yellow, off grades	@..
Sperm, Crude	60 @..
Sperm, Natural Spring	@..
Sperm, Bleached Spring	@..
Sperm, Natural Winter	60 @63
Sperm, Bleached Winter	63 @65
Tallow, Prime	51 @53
Whale, Crude	@..
Whale, Natural Winter	42 @44
Whale, Bleached Winter	44 @46
Menhaden, Brown, Strained	28 @29
Menhaden, Light, Strained	29 @30
Menhaden, Bleached, Winter	31 @32
Menhaden, Ex-Bld. Winter	32 @33
Menhaden, Southern	17 @18
Cocoanut, Ceylon	℔ lb 6¼@ 6¾
Cocoanut, Cochin	℔ lb 6¾@ 7¾
Cod, Domestic, Prime	35 @37
Cod, Newfoundland	40 @42
Red Elaine	31 @32
Red, Saponified	℔ lb 4¾@ 5
Olive, Italian, bbls	54 @57
Neatsfoot, prime	49 @50
Palm, Logoe	℔ lb 5¼@ 5½

Mineral Oils—

Black, 29 gravity, 25@30 cold test	℔ gal. 10½@11½
Black, 29 gravity, 15 cold test	11½@12½
Black, Summer	10½@11½
Cylinder, light filtered	18 @19
Cylinder, dark filtered	16 @17
Paraffine, 903-907 gravity	12¼@13
Paraffine, 903 gravity	11¼@12
Paraffine, 883 gravity	9¼@ 9½
Paraffine, Red	11½@13

In small lots ½¢ advance.

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ₩ doz. $3.00 ..... 33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent 35%
Taplin's Perfection 35%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Eagle Anvils ..... ₩ lb 7¼@7¾¢
Hay-Budden, Wrought ..... 9@9¼¢
Horseshoe brand, Wrought ..... 9@9¼¢
Trenton ..... ₩ lb 9@9¼¢

Imported—
Peter Wright & Sons ..... ₩ lb 10½¢

Anvil, Vise and Drill—
Millers Falls Co., $18.00 ..... 15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co. 33⅓%

Augers and Bits—
Com. Double Spur ..... 70&10%
Boring Mach. Augers ..... 70&10%
Car Bits, 12-in. twist ..... 50&10%
Jennings' Pats. reg. finish. 50&10%
Ford's Auger and Car Bits ..... 40&5
Forstner Pat. Auger Bits 25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list .. 25%
No. 30, R. Jennings' list ..... 40&7½%
Russell Jennings' ..... 25&10&2%
L'Hommedieu Car Bits 15%
Mayhew's Countersink Bits 45%
Millers Falls ..... 50&2&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits ..... 40&10%
Pugh's Black 20%
Pugh's Jennings' Pattern 35%
Snell's Auger Bits 40%
Snell's Bell Hangers' Bits 40%
Snell's Car Bits, 12-in. twist ..... 60&10%
Wright's Jennings' Bits 50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $26 ..... 50&10%
Clark's Pattern, No. 1, ₩ doz. $26; No. 2, $18 ..... 50&10@60%
Ford's, Clark's Pattern ..... 50&10@60%
C. E. Jennings & Co., Steer's Pat. .. 25%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut ..... $3.00@3.25
German Pattern, Nos. 1 to 10, $4.60; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz. $9.00@10.00
Ames ..... 25&10%
New Patent ..... 25&10%
Universal 20%
Wood's Universal 25%

Ship Augers and Bits—
Ford's ..... 33⅓@5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' ..... 35&5%
Ohio Tool Co.'s 40%
Snell's 40%

Awl Hafts— See *Hafts, Awl.*

Awls—
Brad Awls:
Handled ..... gro. $2.75@3.00
Unhdled, Shldered ... gro. 63¢@66¢
Unhandled, Patent .. gro. 66@70¢
Peg Awls:
Unhandled, Patent .. gro. 31@34¢
Unhdled, Shldered .. gro. 65@70¢
Scratch Awls:
Handled, Com ... gro. $3.50@4.00
Handled, Socket .. gro. $11.50@12.00
Hurwood 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights. (up to 3½ lb.)
First Quality $6.50
Second Quality $6.00
NOTE.—Heavier Weights add Extras as per regular schedule.

Axle Grease—
See *Grease, Axle*

Axles— *Iron or Steel*
Concord, Loose Collar ... 4¼@4¾¢
Concord, Solid Collar ... 4¾@5¼¢
No. 1 Common, Loose ... 3¼@3¾¢
No. 1½ Com., New Style 3¾@4¼¢
No. 2 Solid Collar ..... 4@4½¢
Nos. 7, 8, 11 and 12 ... 75@75&5%
Nos. 13 to 14 ..... 70&10@75&5%
Nos. 15 to 18 ..... 75&10@75&10&5%
Nos. 19 to 22 ..... 75&10@75&10&5%

Boxes, Axle—
Common and Concord, not turned lb. 4½@5¢
Common and Concord, turned. lb. 5½@6¢
Half Patent ..... lb. 8½@9¢

Bait— Fishing—
Hendryx:
A Bait 20%
B Bait 25%
Competitor Bait ..... 20&5%

Balances— Sash—
Caldwell new list 50%
Pullman ..... 50&10@60%

Spring—
Spring Balances ..... 60@60&5%
Chatillon's:
Light Spg. Balances ..... 40&10%
Straight Balances 40%
Circular Balances 50%
Large Dial 30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb. ... per lb., 2¾@3¼¢

Towel
No. 10 Ideal, Nickel Plate .. ₩ gro. $8.50

Beams, Scale—
Scale Beams ..... 40&10@50%
Chattillon's No. 1 ..... 30%
Chattillon's No. 2 ..... 40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ₩ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ₩ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized .. ₩ doz. $1.75
Western W. G. Co.:
No. 1 Electric ..... ₩ gro. $7.80
No. 2 Buffalo ..... ₩ gro. $9.00
No. 3 Perfection Dust ..... ₩ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, No. A, Japanned ... ₩ doz. $1.20
Holt, No. 1, Tinned ..... ₩ doz. $1.50
Holt, No. B, Japanned ... ₩ doz. $2.00
Holt, No. 2, Tinned ..... ₩ doz. $2.25
Lyon, No. 2, Japanned ... ₩ doz. $1.25
Lyon, No. 3, Japanned ... ₩ doz. $1.50
Taplin Mfg. Co.: ₩ gro.
No. 60 Improved Dover $6.00
No. 75 Improved Dover $6.50
No. 100 Improved Dover $7.00
No. 102 Improved Dover, Tin'd .. $8.50
No. 150 Improved Dover, Hotel .. $15.00
No. 152 Imp'd Dover, Hotel, T'd .. $17.00
No. 200 Imp'd Dover Tumbler $8.50
No. 202 Imp'd Dover Tumbler, T'd .. $9.50
No. 300 Imp'd Dover Mammoth, ₩ doz. $25.00
Western, W. G. Co., Buffalo $7.00
Wonder (S. S. & Co.) .. ₩ gro. net, $6.00

Bellows—
Blacksmith, Standard List .. 60&10@70&10%

Blacksmiths'— (Net Prices.)
Inch .. 30 32 34 36 38 40
Each .. $3.25 3.50 4.00 4.50 5.00 5.75
Extra Length:
Each .. $3.75 4.25 4.75 5.25 6.00 7.00

Hand— (Net Prices.)
Inch ... 6 7 8 9 10
Doz ... $4.50 5.00 5.50 6.00 6.50

Molders— (Net Prices.)
Inch . 9 10 11 12 14
Doz . $8.00 9.00 10.50 12.50 14.50

Bells— Cow—
Ordinary goods ... 75&5@75&10&5%
High grade ..... 70&10@70&10&5%
Jersey ..... 75&10%
Texas Star 50%

Door—
Abbe's Gong 45%
Burton Gong 50%
Home, R. & E. Mfg. Co.'s ..... 55&10%
Lever and Pull, Sargent's .... 60&10&10%
Trip Gong ..... 50&10@50&10&5%
Yankee Gong 55%

Hand—
Hand Bells, Polished, Brass .. 60&5@60&10&5%
White Metal 60%
Nickel Plated .... 50&10@50&10&5%
Swiss ..... 60@60&7½%
Cone's Globe Hand Bells ..... 33⅓@35%
Silver Chime ..... 33⅓@35%

Miscellaneous—
Farm Bells ..... lb. 2¼¢
Steel Alloy Church and School 50&10&5@60&5%
American Tube & Stamping Co. Gongs 75%
Table Call Bells ..... 50@50&10%

Belting— Leather—
Extra Hvy, Short Lap .. 60@60&5%
Regular Short Lap ... 65&10@70%
Standard ..... 70&5@70&10%
Light Standard ..... 70&10@75%
Cut Leather Lacing ..... 60&10%
Leather Lacing Sides, per sq. ft. 17½@18¢

Rubber—
Agricultural (Low Grade) ..... 75@75&5%
Common Standard .... 70@70&10%
Standard ..... 65&70%
Extra ..... 60&5@60&10%
High Grade ..... 50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender 40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—
John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—
Common Wooden .... 70&10@75&5%
Hartz St. Tackle Blocks ..... 50@50&5%
Hollow Steel Blocks, with Ford's Patent Sheaves ..... 50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty Mal. Iron .... 50&10%
Stowell's Self Loading 60%
See also Machines, Hoisting.

Boards, Stove—
Zinc, Crystal, &c ... 30&10@40&10%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co. 33⅓%

Bolts—
Carriage, Machine, &c.—
Common Carriage (cut thread): ⅜ x 6 and Smaller 75%
Larger and longer .. 65&10&2½%
Phila. Eagle, $3.00 list May 2, '99 ..... 80%
Bolt Ends, list Feb. 1, '95 .. 70&2½%
Machine, ⅜ x 4 and smaller 75&2½%
Machine, larger and longer .. 70&5%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:
Inch 3 4 5 6 8
Per doz. $0.30 .35 .45 .56 .75
Cast Iron Spring Foot, Jap'd:
Inch 6 8 10
Per doz $1.15 1.40 2.00
Cast Iron Chain, Flat, Japanned:
Inch 6 8 10
Per doz $0.95 1.25 1.55
Cast Iron Shutter, Japanned, Brass Knobs:
Inch 6 8 10
Per doz ..... $0.80 .90 1.20
Wrt Barrel Japd ..... 80@80&10%
Wrt " Bronzed .... 50@50&10%
Wrt. Spring ... 70&10@70&10&10%
Wrt. Shutter ..... 50&5@50&10&5%
Wrt. Square Neck ..... 75@75&10%
Wrt Square, 66⅔&10@66⅔&10&10%
Ives' Patent Door 60%

Stove and Plow—
Plow ..... 65&10@65&10&10%
Stove ..... 82½&10@82½&10&5%

Tire—
Common 80%
Norway Iron 80%
American Screw Company:
Norway Phila., list Oct. 16, '84 .. 80%
Eagle Phila., list Oct. 16, '84 .... 82½%
Bay State, list Dec. 28, '99 ..... 80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84 .. 80%
Eagle Phila., list Oct. 16, '84 .... 82½%
Eclipse, list Dec. 28, '99 ..... 80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99 ..... 80%
Norway Phila., list Oct., '84 ..... 80%
Upson Nut Co.:
Tire Bolts 72½%

Borers, Tap—
Borers Tap, Ring, with Handle:

Inch	*1¼*	*1½*	*1¾*	*2*
Per doz	*$4.80*	*5.60*	*6.40*	*8.00*
Inch			*2¼*	*2½*
Per doz			*$5.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each 25%

Boxes, Mitre—
C. E. Jennings & Co. 30%
Langdon ..... 15&10%
Perfection ..... ₩ doz. $30.00
Schatz 40%
Stanley R. & L. Co.:
Nos. 240 to 460 ..... 30%
Nos. 50 and 60 ..... 35%

Braces—
Common Ball, American . $1.25@1.30
Barber's ..... 50&10&10@60&10%
Fray's Genuine Spofford's 60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 ..... 60%
C. E. Jennings & Co. ..... 50&5%
Mayhew's Ratchet 60%
Mayhew's Quick Action Hay Pat. .. 50%
Millers Falls Drill Braces ..... 25&10%
P., S. & W. Co., Peck's Pat. 60&10@65%
Stanley R. & L. Co.:
Stanley 35%
Victor 45%

Brackets—
Wrought Steel ... 80&10@80&10&5%
Bradley's Wire Shelf:
Full cases ..... 80&10&10%
Broken cases ..... 80&10%
Griffin's Pressed Steel ..... 80@80&10%
Griffin's Folding Brackets ..... 70&10%
Stowell's Cast Shelf 75%
Stowell's Sink 60%
Western, W. G. Co., Wire ..... 60&10%

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co. ..... 75&20%
Western, W. G. Co. 80%
Wire Goods Co. ..... 7c@75&10%

Buckets, Galvanized—
Price per dozen.

Quart	*10*	*12*	*14*
Water, Regular	*1.40*	*1.70*	*1.90*
Water, Heavy	*3.40*	*3.70*	*3.80*
Fire, Rd. Bottom	*2.30*	*2.55*	*2.95*
Well	*2.55*	*2.87*	*3.15*

Bucks, Saw—
Hoosier ..... ₩ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts— Brass—
Wrought, list Sept., '96 ..... 30%
Cast Brass, Tiebout's 50%

Cast Iron—
Fast Joint, Broad .... 40&10@50%
Fast Joint, Narrow ... 40&10@50%
Loose Joint ..... 70&10@75%
Loose Pin ..... 70&10@75%
Mayer's Hinges ..... 70&10&5
Parliament Butts ..... 70&10&5

Wrought Steel— (Net Prices.)
Table and Back Flaps ... 75%
Narrow and Broad 75%
Inside Blind 75%
Loose Pin 75%
Loose Pin, Jap'd ..... 70&10%
Loose Pin, Ball and Steeple Tip 85%
Japanned Ball Tip Butts ... 70&10%
Bronzed, Wrt., Nar. and Inside Blind Butts .... 55&10%

Cages, Bird—
Hendryx Brass:
3000, 5000, 1100 series 5%
1200 series 33⅓%
200, 300, 600 and 900 series ..... 60&10%

Hendryx Bronze:
700, 800 series....40&10%
Hendryx Enameled....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong....per lb.4¢4½¢
Sharp, 1 prong...per lb., 4½@4½¢
Gautier, Blunt....4@4½¢
Gautier, Sharp....4½@4¾¢
Perkins', Blunt Toe....₩ lb 3.65¢
Perkins', Sharp Toe....₩ lb 4.15¢

Can Openers—

See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$18.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B....52@55¢
G. D....per M 34@35¢
F. L....per M 40@42¢
G. E....per M 58@60¢
Musket....per M 62@63¢

Primers—

Berdan Primers, $2 per M...20%
B. L. Caps (Sturtevant Shells) $2 per M....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50....10&5%
38 C. F., $7.00....10&5%
22 cal. Rim, $1.50....10&5%
32 cal. Rim, $2.75....10&5%
B. B. Caps, Con. Ball, Swgd. $1.90
B. B. Caps, Round Ball....$1.49
Central Fire....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting....50%
Rim Fire, Military....15&5%

Casters—

Bed....70@70&10%
Plate....60&10@60&10&5%
Philadelphia....75@75&10%
Acme, Ball Bearing....33⅓%
Boss....70&10%
Boss Anti-Friction....70&10%
Gem (Roller Bearing)....80%
Martin's Patent (Phoenix)....45%
Standard Ball Bearing....45%
Tucker's Patent low list....30%
Yale (Double Wheel) low list....50%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$7.50	5.35	4.40	3.70	3.55	3.45	3.40

⅝ ¾ ⅞ 1 to 1¼ inch.
$3.35 3.30 3.25 3.25 per 100 lb.
German Coil....60&10&10@70%

Halters and Ties—

Halter Chains...60&10@60&10&10%
German Pattern Halter Chains, list July 24, '97....60&10&10%
Cow Ties....60@60&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring.$23.50
6½—6-2, Str'ght, with ring.$24.50
6½—8-2, Str'ght, with ring.$28.00
6½—10-2, Str'ght, with ring.$32.00
NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.
Trace, Wagon and Fancy Chains....60&5@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron....60&10@60&10&5%
Brass....60&10@60&10&10%
Safety Chain....75@75&10&5%
Gal. Pump Chain....lb. 5@5¼%
Covert Mfg. Co.:
Breast....35&5%
Halter....35&5%
Heel....35&5%
Rein....35&5%
Stallion....35&5%
Covert Sad. Works:
Breast....70%
Halter....70%
Hold Back....70%
Rein....70%
Oneida Community:
Am. Coil and Halters....40@40&5%
Am. Cow Ties....45@50%
Eureka Coil and Halter....45@50&5%
Niagara Coil and Halter....45@50&5%
Niagara Cow Ties....45&5@50&10&5%
Niagara Wire Dog Chains..45@50&5%
Wire Goods Co.:
Dog Chain....70&10%
Universal Dbl.-Jointed Chain....50%

Chalk—(From Jobbers.)

Carpenters' Blue....gro. 35@38¢
Carpenters' Red....gro. 30@33¢
Carpenters' White....gro. 25@28¢
See also Crayons.

Checks, Door—

Bardsley's....45%
Columbia....50&10%
Eclipse....60&10%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools....55%
Youths' Chests, with Tools....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools....20%
Machinists' and Pipe Fitters' Chests, Empty....50%
Tool Cabinets....50%
C. E. Jennings & Co.'s Machinists' Tool Chests....33⅓&15%

Chisels—

Socket Framing and Firmer

Standard List....75@75&10%
Buck Bros....30%
Charles Buck....30%
C. E. Jennings & Co. Socket Firmer No. 10....60%
C. E. Jennings & Co. Socket Framing No. 15....60%
Ohio Tool Co.'s....70%
Swan's....70%
L. & I. J. White....30@30&5%

Tanged—

Tanged Firmers.33 1-3@33 1-3&10%
Buck Bros....30%
Charles Buck....30%
C. E. Jennings & Co. Nos. 191, 181....25%
L. & I. J. White, Tanged....25&5%

Cold—

	lb.
Cold Chisels, good quality	*13@15¢*
Cold Chisels, fair quality	*11@12¢*
Cold Chisels, ordinary	*9@10¢*

Chucks—

Beach Pat., each $8.00....35&5%
Fratt's Positive Drive....25%
Empire....25%
Blacksmiths'....25%
Skinner Patent Chucks:
Independent Lathe Chucks....50%
Universal....50%
Combination....50%
Drill Chucks, New Model....30%
Drill Chucks, Standard....45%
Drill Chuck, Skinner Pat., 0, 1, 2..35%
Drill Chucks, Skinner Pat., 3, 4, 5, 6, 7, 8....35%
Drill Chucks, Positive Drive....30%
Planer Chucks....25%
Face Plate Jaws....40%
Standard Tool Co.:
Improved Drill Chuck....45%
Union Mfg. Co.:
Combination....50%
Czar Drill....35%
Combination Geared Scroll....40%
Geared Scroll....40%
Independent....50%
Independent Steel....40%
Union Drill....45%
Universal....50%
Independent Iron F. Plate Jaws.40%
Independent Steel F. Plate Jaws.40%
Westcott Patent Chucks:
Lathe Chucks....50%
Little Giant Auxiliary Drill....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved....50%
Oneida Drill....50%
Scroll Combination Lathe....50%

Clamps—

Adjustable, Hammers'....20@20&5%
Cabinet, Sargent's....50&10%
Carriage Makers', P. S. & W. Co..50%
Carriage Makers', Sargent's....60%
Besly, Parallel....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co....40%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable....55%
Iwan's Champion, Stationary....45%

Sidewalk—

Star Socket, All Steel..₩ doz. $4.05 net
Star Shank, All Steel..₩ doz. $3.24 net
W. & C. Shank, All Steel, ₩ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros....30%
New Haven Edge Tool Co.'s....45%
Fayette R. Plumb....33⅓@33⅓&10%
L. & I. J. White....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse....$8.75 } 15%
1902 Chicago Horse....10.75 }
20th Century Horse, each, $5.00....20%
Lightning Belt....$15.00 }
Chicago Belt....$20.00 } 15%
Stewart's Patent Sheep, $12.75....20%

Finger Nail Clippers—

Smith & Hemenway Co.₩ doz. net $2.00

Clips, Axle—

Eagle, 5-16 and ⅜ in..75@75&10%
Norway, 5-16 and ⅜ in..60&10@70%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list: Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks....70&10@75%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list....40%
Leather, Walter B. Stevens & Son's list....40%

Combs, Curry—

Metal Stamping Co....40%

Mane and Tail—

Covert's Saddlery Works....60&10%

Compasses, Dividers, &c.

Ordinary Goods....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers....65%
Calipers, Double....65%
Calipers, Inside or Outside....65%
Calipers, Wing....60%
Compasses....50%

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
A Eastern	*75&5%*	*75%*
B, Eastern	*75&10%*	*75&5%*
Central	*75&5%*	*70&10&5%*
Southern	*70&7½%*	*70&7½%*
S. Western	*70&5%*	*70%*

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each	2	3	4	6	8	
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70	
Gal.	3	4	6	8		
Iceland, ea.	$1.80	$2.10	$2.40	$3.00		
Gal.	2	3	4	6	8	
Galv. Lined, ea.	$1.85	$2.00	$2.25	$2.90	$3.90	25%
Gal. Lined, side handles, Gal.	2	3	4	6	8	
Each	$1.95	$2.15	$2.40	$3.30	$4.15	.25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab....lb. 35¢
Braided White, Com. lb. 21@22½%
Cable Laid Italian....lb., A, 18¢; B, 16¢
Common India....lb. 10@10½¢
Cotton Sash Cord, Tw'ted..11@17¢
Patent Russia....lb...@14¢
Cable Laid Russia....lb...@15¢
India Hemp, Braided..lb...@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted. lb. 12@13¢
Anniston Cordage Co.: Braided Cotton, Old Glory, Nos. 7 to 12....₩ lb 28 ¢
Anniston, Nos. 7 to 12....₩ lb 22 ¢
Old Colony, Nos. 7 to 12..₩ lb 22 ¢
Anniston Drab, Nos. 7 to 12.₩ lb 26 ¢
Pearl Braided, cotton, No. 6, ₩ lb, 22½¢; No. 7, 21½¢; Nos. 8 to 12, 21¢
Eddystone Braided, Nos. 7, 8, 9 and 10....₩ lb 24 ¢
Eddystone Braided Cotton, No. 6..₩ lb 25 ¢
Harmony Cable Laid Italian, Nos. 7 to 10....₩ lb 23 ¢
Peerless:
Cable Laid Italian....16 ¢
Cable Laid Russian....14 ¢
Cable Laid India....12 ¢
Braided India....18 ¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton....₩ lb 40 ¢
Braided, Italian Hamp....₩ lb 40 ¢
Braided, Linen....₩ lb 55 ¢
Braided, White Cotton or Spot....₩ lb 35 ¢
Massachusetts, White....₩ lb 28 ¢
Massachusetts, Drab....₩ lb 32 ¢
Phoenix, White, Nos. 8 to 12, 24¢; No. 7, 24½¢; No. 6, 25½¢.
Silver Lake:
A quality, Drab....40 ¢
A quality, White....35 ¢
B quality, Drab....35 ¢
B quality, White....30 ¢
Italian Hemp....40 ¢
Linen....57½ ¢

Case lots, 20%

Wire, Picture—

List Oct., '00....85&10&10@85&10&10&5%
Hendryx Standard Wire Picture Cord, 85&10&5%

Cradles—

Grain....40&12½%

Crayons—

White Round Crayons, gr. 5½@6¢
Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.:
Jumbo Crayons....gr. $3.50
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square....gr. $1.50
Rolling Mill Crayons....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Zelnicker's Lumber:
Red, Blue, Green....₩ gro. $6.50
Black....₩ gro. $4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, Heavy....₩ doz. $7.00
Fort Madison, Light....₩ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847..₩ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor....₩ doz. $3.00
Wm. Rogers & Son....₩ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co....40%
Red Devil....50%
Smith & Hemenway Co....50%
Woodward....40%

Meat and Food—

American....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise....25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's....₩ doz. 30&10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal....40&10@50%
Little Giant....₩ doz. 33⅓@40%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers....40%
New Triumph No. 606, ₩ doz. $24.00..30&10@40%
Russwin Food, No. 1, $24.00; No. 2, $27.00....45&10&10%
Woodruff's....₩ doz. 30&10@40%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₩ doz. $3.00
Combined Slaw Cutter and Corn Grater....₩ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters....40%
Slaw Cutters, 1 Knife..₩ gr. $18@$20
Slaw Cutters, 2 Knife..₩ gr. $22@$36

Tobacco—

All Iron, Cheap..doz. $4.25@$4.50
Enterprise....25@30%
National, ₩ doz., No. 1, $21; No. 2, $18....40%
Sargent's, ₩ doz., No. 2....60%
Sargent's, Nos. 12 and 21....60&10%

Washer—

Appleton's, ₩ doz., $16.00....50&10&10%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz., $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers....₩ doz. $6.25
Iwan's Perfection Post Hole Digger..₩ doz. $8.25
Iwan's Split Handle Post Hole Diggers....₩ doz. $7.25
Kohler's Universal....₩ doz. $15.00
Kohler's Little Giant....₩ doz. $12.00
Kohler's Hercules....₩ doz. $10.00
Kohler's Invincible....₩ doz. $9.00
Kohler's Rival....₩ doz. $8.00
Kohler's Pioneer....₩ doz. $7.20
Never-Break Post Hole Diggers, ₩ doz., $24.00....40%
Samson, ₩ doz. $34.00....25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ⅞ in....₩ doz. $10.00
Phillips', style 077, ⅞ in....₩ doz. $7.50
Phillips', style x-y, ⅞ in....₩ doz. $10.50

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₩ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill, each....$1.50@$1.75
Breast, Millers Falls....15&10%
Breast, P. S. & W....40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3....16⅔%
Johnson's Drill Points....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis....25%
Ratchet, Parker's....40%
Ratchet, Weston's....33⅓%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00....33⅓%

Twist Drills—

Bit Stock....60&10&10@70%
Taper and Straight Shank....60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@60¢
Balsey's Screw Holder and Driver, ₩ doz., 2½-in., $6; 4-in., $7.50; 6-in., ₩....40%
Buck Bros.' Screw Driver Bits....30%
Champion....50%
Edson....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood....40%
Mayhew's Black Handle....40%
Mayhew's Monarch....40&10%
Millers Falls, Nos. 20 and 21....25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Never Turn....60%
New England Specialty Co....50%
Sargent & Co.'s:
Nos. 1 and 60....50&10&10%
Nos. 50 and 55....60&10%
Nos. 20 and 40....70&10%
Smith & Hemenway Co....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles....65%
No. 86....75%
Victor....55%
Defiance....70%
Swan's:
Nos. 65 to 68....50%
No. 40....40&10%
Nos. 25, 35 and 45....25&10&10%

Eave Trough, Galvanized—

Territory.	*L. C. L.*
A, Eastern	*80&7½%*
B, Eastern	*80&12½%*
Central	*80&7½%*
Southern	*70&20&10%*
S. Western	*75&12½%*

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments:
Galv. Steel and Galv. C. C. Iron or Tin....60&10%
Copper....37½%
Perfect Elbows (S., S. & Co.)....40%

Emery, Turkish—

	½ to ½	5½ to 180	Flour
Kegs	*lb. 5 ¢*	*5½¢*	*3½¢*
½ Kegs	*lb. 5¼¢*	*5¾¢*	*3¾¢*
¼ Kegs	*lb. 5½¢*	*6 ¢*	*4 ¢*
10-lb. cans, 10 in case	*6½¢*	*7 ¢*	*6 ¢*
10-lb. cans, less than 10	*10 ¢*	*10 ¢*	*8 ¢*
Less quantity	*10 ¢*	*10 ¢*	*8 ¢*

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's....50&10%
Walling's....45%

Cord and Weight—

Ives....40%

Faucets—

Cork Lined.....50@50&10%
Metallic Key, Leather Lined..60&10@70%
Red Cedar.....40&10@50%
Petroleum.....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star.....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined...50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List revised Nov. 1, 1899.
Best Brands.....70&10@75&5%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97.....33 1-3@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103.....$4.00
Special, No. 104.....$4.00
Fusible Links.....$0.25
Expansion Bolts.....50&10%

Grindstone—

Net Prices:

Inch	15	17	19	21	24
Per doz.	$2.15	2.85	3.25	3.75	4.50

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's.....70%
Stowell's Giant Grindstone Hanger, ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy.....50&10&10%
Stowell's Grindstone Fixtures, Light.....60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66%
Victor, Header.....65%
Champion, Hay.....66%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	1	2	3	4	6
Each	$1.30	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp.....$2.75
Cotton.....3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&5&2½%

Gates, Molasses and Oil—

Stebbins' Pattern.80&10@80&10&5%

Gauges—

Marking, Mortise, &c......50&10&5@50&10&10&5%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....35%
Marking and Mortise.....60%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....30&10%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co.....60@60&10&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush..25@50%
Cans (½ pts., pts., qts., ½ gal., gal.).....25@48%
International Glue Co. (Martin's)....40&10%

Grease, Axle—

Common Grade....gro. $4.50@5.50
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting, in boxes, ℔ doz. 1 lb, $1.20; 2 lb, $2.00

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each.....$6.00 }
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....$3.25

Halters and Ties—

Covert Mfg. Co.:
Web.....35&5%
Jute Rope.....50%
Sisal Rope.....30&10%
Cotton Rope.....45%
Hemp Rope.....45%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties.....70%
Sisal Rope Ties.....60&10%
E. T. Rugg & Co.:
Leather Halters.....50%
Web Halters and Webbing.....60%
Jute and Sisal Rope Halters.....60%
Jute and Sisal Horse and Cattle Ties.....60%
Cotton Horse Ties.....60%
Livery Ties, Braided.....60%

Hammers—

Handled Hammers—

Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox.....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail.....33⅓&7⅛@33⅓&10&7⅛%
Engineers' and B. S. Hand.....50&7⅛&5@50&10&7⅛&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—

Under 3 lb., per lb. 50¢.....80&10&10@85%
3 to 5 lb., per lb. 40¢.....80&10&10@85%
Over 5 lb., per lb 30¢...85@85&10%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c.....60&5@60&10&5%
Hoe, Rake, &c.....45@50&5%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50&5%
D Handles.....40%

Cross-Cut Saw Handles—

Atkins'.....40&5%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handles—

Auger, assorted...gro. $2.50@2.85
Brad Awl.....gro. $1.65@1.85
Chisel Handles:
Apple Tanged Firmer, gro. assorted.....$2.40@2.65
Hickory Tanged Firmer, gro. assorted.....$2.15@2.40
Apple Socket Firmer, gro. assorted.....$1.75@1.95
Hickory Socket Firmer, gro. assorted.....$1.45@1.60
Hickory Socket Framing, gro. assorted.....$1.60@1.75
File, assorted.....gro. $1.30@1.40
*Hammer, Hatchet, Axe, &c.*60&10@60&10&10%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle....℔ gro. $0.85@$1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c

Barn Door, New Pattern, Round Groove, Regular:

Inch	3	4	5	6	8
Single Doz.	$0.90	1.25	1.60	1.95	2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch	3	4	5	6
Single Doz.	$1.30	1.85	2.50	3.00

Allith Mfg. Co.:
Reliable, No. 1.....per doz. $8.00
Reliable, No. 2.....per doz. $9.60
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10&5%
Roller Bearing.....75&5%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.60&10&2½%
Hinged.....net $6.40
Covered.....60&10%
Special.....70&5%
Lawrence Bros.:
Advance.....60&10%
Cleveland.....70&5%
Clipper, No. 75.....60%
Crown.....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.....60%
Giant.....60&5%
Hummer.....70&5%
New York.....60&10%
Peerless.....70&5%
Sterling.....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3..$2.15
Ball B'r'g St'l Track No. 10.$2.40
Roller B'r'g St'l Track No. 12.$2.30
Ball B'r'g St'l Track No. 13.$2.40
Roller B'r'g St'l Track No. 14.$2.30
Hero, Adj. Track No. 19.....50%
Adjustable Track Tandem Trolley Track No. 16.....50%
Seal, Steel Track No. 8.....$2.40
Auto Adj. Track No. 22..40&10%
Trolley B. D. No. 17.....$1.40
Trolley F. D. No. 120.....$2.35
Trolley F. D. No. 123.....$2.45
Trolley F. D. No. 150.....$2.60
Safety Underwriters F. D. No. 101.....$2.25
Tandem No. 44.....70&5%
Trolley F. D. No. 151.....$3.00
Palace, Adjustable Track No. 132.....40&10%
Royal, Adjustable Track No. 122.....40&10%
Ives' Wood Track No. 1.....$2.15
Trolley B. D. No. 20.....$1.35
Trolley B. D. No. 24.....$1.45
Trolley B. D. No. 27.....$1.50
Trolley B. D. No. 123.....$1.66
Roller Bearings Nos. 39, 40, 41, 43, 44.....70&5%
Anti-friction No. 42.....60&10%
Hinged Tandem No. 48.....60%
Folding Door B. B. Swivel No. 135.....30%
Safety Door Hanger Co.:
Storm King Safety.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas.....60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator.....40%
Express.....50%
Freight Car Door.....60%
Interstate.....60&10%
Lundy Parlor Door.....50&10%
Magic.....60%
Matchless.....60&10%
Nansen.....70&5%
Parlor Door.....50&10%
Railroad.....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 401, 500....50&10%
Underwriters' Fire Door.....40%
Wild West Warehouse Door..50%
Zenith for Wood Track....50&10%
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10%
Eagle.....70%
Hylo Hinge.....60%
New Perfection.....60%
Pilot.....60%
Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing...60&10&5%
New Era Roller Bearing..50&10%
O. K. Roller Bearing..60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing....60&10%
Tandem, Nos. 1 and 2.....60%
Underwriters' Roller Bearing..40%
Velvet.....50%
Wilcox Auditorium Ball B'r'g.20%
Wilcox Barn Trolley No. 123..40%
Wilcox Elv. Door, Nos. 112 and 122½.....50%
Wilcox Elv. Door, No. 132....40%
Wilcox Fire Trolley, Roller Bearing.....50%
Wilcox Le Roy Noiseless Ball Bearing.....40%
Wilcox New Century..50&10&10%
Wilcox O. K. Steel Track....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing..40%
Wilcox Wideman Narrow Gauge Ball Bearing.....40%
For Track, see Rail.

Extra 5@10% often given.

Hangers— Garment—

Pullman Trouser, ℔ gro., No. 1, $9.00; No. 4, $24.00; No. 7, $7.50.
Victor Folding.....℔ gro. $9.00
Western, W. G. Co.....70&10%

Gate—

Myers' Patent Gate Hangers, ℔ doz. net.....$4.50

Hasps—

Griffin's Security Hasp.....50%
McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—

Regular list, first quality.40&7½%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	1	3	5
Doz. pair	$0.75	1.35	2.70

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	1	1½	2	2½
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter (Buffalo, &c.):

No.	1	1½	2
Doz. pair	$0.70	.65	.60

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker.....70@75%
Reading's Gravity.....60%
Sargent's, Nos. 1, 3, 5, 11 and 13..75%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55.....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5.....75&10&5%
Tip Pat'n, Nos. 1, 3 & 5...75&10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with L't'ch	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	.35

New England:
With Latch.....*doz.*....@$2.00
Without Latch...*doz.*....@$1.60
Reversible Self-Closing:
With Latch.....*doz.*....@$1.75
Without Latch...*doz.*....@$1.35
Western:
With Latch.....*doz. $1.75*
Without Latch.....*doz. $1.15*
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets,

Nos.	1	2	3
Hinges with Latches..	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges—

Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—

Holdback Cast Iron.....gro. $9.00@$9.50
Non-Holdback, Cast Iron.....gro. $8.00@$8.50

J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor Hinges.....40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor Hinge.....50%
Garden City Engine House....25%
Keenes Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American.....30%
Columbia, No. 14.....℔ gr. $9.00
Columbia, No. 18.....℔ gr. $25.00
Columbia, Adjustable, No. 7, ℔ gr. $12.00
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.50
Oxford, new list.....30%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges.....40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....$9.00
Chief Ball B'r'g Floor Hinge.50%
Ohio Detachable Screen Door Hinge.....℔ gr. $12.00
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea, No. 1.....℔ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k, ℔ gro. pr. $9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:

Extra 10@10&5%

Light Strap Hinges..70%
H'vy Strap H'g's...75&5%
Light T Hinges.....65%
Heavy T Hinges.....60%
Extra H'y T H'g's.70&10%
Hinge Hasps.....50%
Cor. Heavy Strap..75&5%
Cor. Ex. Heavy T.70&10%

Screw Hook and Strap.
6 to 12 in..lb. 3½¢
1¼ to 20 in..lb. 3¼¢
22 to 36 in..lb. 3 ¢

Screw Hook and Eye:
¾ to 1 inch.....lb. 6 ¢
⅝-inch.....lb. 7 ¢
½-inch.....lb. 9 ¢

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers....35%

Hods— Coal—

	Per doz.			
Inch	15	16	17	18
Galv. Open	$2.50	2.75	3.00	3.25
Jap. Open	$1.90	2.10	2.25	2.55
Galv. Funnel	$3.00	3.30	3.60	3.90
Jap. Funnel	$2.45	2.65	2.85	3.30

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10

Hoes— Eye—

Scovil and Oval Pattern.....60&10@60&10&10%
Grub, list Feb. 23, 1899.....70&10@75&10%
D. & H. Scovil.....35%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ℔ doz. $4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ℔ doz. $24.00.....45&10%

Door—

Bardsley's.....45%
Empire.....50%
Pullman.....50%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ℔ gross, $10.80; ℔ doz.....$1.25

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List.....50&10&10%
Clothes Line, Reading List.....40%
Clothes Line, Sargent's List.50&20&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Belt.....80&10@..%
Wire C. & H. Hooks:.....75&10@75&10&5%
Atlas, Coat and Hat:
Single Cases.....75%
10 Case Lots.....75&10%
Columbian Hdw. Co., Gem.....60&10%
Parker Wire Goods Co., King..75&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co, Molding.....75%
Wire Goods Co.:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....70&10%
Czar Harness.....50&10%

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—

Hooks, Bench, see Stops, Bench. Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.50
Grass, common grades, all sizes, per doz......$1.30
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&10&5@60&10&10%
Malleable Iron..70&10@70&10&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....35%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 5 @ 6 ¢
3-ply Standard.....ft. 8 @ 9 ¢
4-ply Standard.....ft. 10 @11 ¢
3-ply extra.....ft. 11 @13 ¢
4-ply extra.....ft. 14 @16 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—

From 4 to 10.....lb. 2¾@3 ¢
B. B. Sad Irons.....lb. 3¼@3½¢
Chinese Laundry....lb. 4¾@5 ¢
Chinese Sad.....lb. 4 @4¼¢
Mrs. Potts', cents per set:

	Nos.	50	55	60	65
	Jap'd Tops	62	59	72	69
	Tin'd Tops	65	62	75	72

New England Pressing.lb. 3¾@4¢

Pinking—

Pinking Irons.....doz. 50@60¢

Soldering—

Soldering Coppers, 2½ & 3.20@21¢
1½ & 2.....22@23¢

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%
Steel.....45%
Covert's Saddlery Works:
Daisy.....60&10%
Victor.....60%
Lockport.....50%
Lane's Steel.....30&10&5%
Richards' Tiger Steel, No. 130.....40%

Kettles—

Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%

Corn—

Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....75%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's.....70&10&2½%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge..per doz.$5.25@5.50
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

Mincing—

Buffalo.....℔ gro. $13.00

Miscellaneous—

Farriers'.....doz. $3.00@3.25
Wostenholm's.....℔ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber tip.....gro.$1.15@1.20
Carriage, Jap., all sizes.....gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....40%
Climax Shelf, No. 113.....40%
Trolley, No. 109.....40%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....50&10%

Lanterns— Tubular—

Regular Tubular, No. 0.....doz. $4.25@4.85
Lift Tubular, No. 0.....doz. $4.50@5.15
Hinge Tubular, No. 0.....doz. $4.50@5.15
Other Styles.....40&10@40&10&5%

Bull's Eye Police—

No. 1, 2¾-inch.....$2.50@2.75
No. 2, 3-inch.....$2.75@3.00

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—

Roggin's Latches, with screw..doz. 35@40¢

Door—

Richards' Bull Dog, Heavy No. 125.40%
Richards' Trump, No. 127.....50%

Leaders, Cattle—

Small.....doz. 50¢; *large*, 80¢
Covert Mfg. Co., Cotton and Hemp.45%

Lifters, Transom—

R. & E.....33⅓%

Lines—

Wire Clothes, Nos.	18	19	20
100 feet	$2.20	2.00	1.65
75 feet	$1.80	1.70	1.30

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Anniston Waterproof Clothes, 50 ft., ℔ gro. $24.00; Gilt Edge, $22.00; Air Line, $22.00; Acme, $17.00; Alabama, $15.00; Empire, $14.00; Advance, $13.50; Oriole, $20.00; Albemarle, $13.50; Eclipse, $12.50; Chicago, $11.00; Standard, $10.00; Columbia, $8.50; Allston, $12.50; Calhoun, $11.00.

Locks— Cabinet—

Cabinet Locks...33⅓@33⅓&7½%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%
Sargent & Co.....10&10%
Stowell's Steel Door Latch.....50%

Elevator—

Stowell's.....50%

Padlocks—

Wrought Iron....75&10&5@80&5%
R. & E. Mfg. Co. Wrought Steel and Brass.....75@75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50&10%
Iron.....62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock...25%
Reading.....40%

Machines—Boring—

Com. Upr't, without Augers.$2.00
Com. Ang'l'r, without Augers.$2.25
Without Augers.

R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3..	$4.25	No. 1..$5.00
Improved No. 4..	3.75	No. 2.. 3.38
Improved No. 5..	2.75	
Jennings', Nos. 1 and 4		35&5%
Millers' Falls		5.75
Snell's, Rice's Pat.	2.50	2.75

Corking—

Reisinger Invincible Hand Power.....℔ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

Ice Cutting—

Chandler's.....12½%

Washing—

Ross Washing Machine Co.: Per doz.
Champion Rotary Banner No. 1..$54.00
Standard Champion No. 1.....$48.00
Standard Perfection.....$26.00
Cinti Square Western.....$30.00
Uneeda American, Round.....$29.00

Mallets—

Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Applewood.....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mashers, Vegetable—

Western, W. G. Co., Potato....60&10%

Mats, Door—

Elastic Steel (W. G. Co.).....10%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted.
Cheap.....all sizes, $1.75@2.00
Good.....all sizes, $2.25@2.50

	10	12	14	16-in.
High Grade	4.25	4.50	4.75	5.00

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M., S., C., K., T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—

Wire Nails and Brads, Papered, List July 20, 1899..85&10&10@90%
Cut and Wire. See Trade Report.
Hungarian, Finishing, Upholsterers' &c. See Tacks.

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	25	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%
Putnam	23	21	20	19	18	....33⅓%
New Putnam	19	18	17	16	16	..10&10%
Western						..℔ lb 8½¢

Jobbers' Special Brands.....per lb. 8½@10¢

Picture—

	1½	2	2½	3	3½ in.
Brass H'd.	.45	.55	.60	.70	.. gro
Por. Head	1.10	1.10	1.10		.. gro

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Mfrs. or U. S. Standard.
Square, Blank.....$4.80
Hexagon, Blank.....$5.30
Square, Blank, C. T. & R...$5.00
Hexagon, Blank, C. T. & R..$5.70
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square, Blank.....$5.30
Hexagon, Blank.....$5.70
Square, Tapped.....$5.20
Hexagon, Tapped.....$5.60

Oakum—

Best or Government.....lb. 6½¢
Navy.....lb. 5 ¢
U. S. Navy.....lb. 6 ¢
Plumbers' Spun Oakum.....2½¢
In carload lots ¼¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Chase or Paragon:
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Imp'ed, No. 1 $3.60; No. 2, $4; No. 3, $4.40. ℔ doz. 25%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can—

Per doz.
Sprague, Iron Handle....30@35¢
Sprague, Wood Handle...35@40¢
Sardine Scissors.....$1.75@$3.00
National.....50%
Stowell's Sprague.....℔ doz. 35@45¢

Egg—

Nickel Plate.....℔ doz., $3.00
Silver Plate.....℔ doz., $4.00

Packing—

Asbestos Packing, Wick and Rope.....lb. 14@16¢

Rubber—

(Fair quality goods.)
Sheet, C. I......8@10¢
Sheet, C. O. S......9@13¢
Sheet, C. B. S......10@14¢
Sheet, Pure Gum.....50@65¢
Sheet, Red.....40@50¢
Jenkins' '96, ℔ lb 80¢.....25@25&5%

Miscellaneous—

American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—

S. S. & Co., with gauges—No. 1, $6.25; No. 2, $6.50 ℔ doz.

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List.60&10@60&10&12½%

Fry—

Common Lipped:

Nos.	1	2	3	4	5
Per doz.	$0.75	0.80	0.90	1.10	1.30

Refrigerator, Galva.—

Inch	12	14	16	18
Per doz.	$1.95	2.25	2.80	3.15

Roasting and Baking—

Regal, S., S. & Co., ℔ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

No.	40	50	60	110	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos:	lb.
Building Felt	2¾ ¢
Mill Board, sheet, 40x40 in.	3½¢
Mill Board, roll, thicker than 1-16 inch	3½¢
Mill Board, 1-16 inch thick and less	2½¢

Per roll

Rosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll.....35@40¢
Medium weight, 30 lbs. to roll.....40@45¢
Heavy weight, 40 lbs. to roll..56@60¢
Black Water Proof Sheathing. 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$38.00@40.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 300 sq. ft.), ton ..... $32.50@35.50
2 ply, roll 108 sq. ft. ..... 55@60¢
3 ply, roll 108 sq. ft. ..... 78@85¢
Slater's Felt (roll 500 sq. ft.) ..... 75¢
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.) $2.75

Sand and Emery—

Flint Paper and Cloth ..... 60@60&10%
Garnet Paper and Cloth 25%
Emery Paper and Cl'h ..... 50&10@60%

Parers—Apple—

Advance ..... ℔ doz. $4.00
Baldwin ..... ℔ doz. $4.00
Bonanza Improved ..... each $6.50
Daisy ..... ℔ doz. $4.00
Dandy ..... each $7.50
Eureka Improved ..... each $20.00
Family Bay State ..... ℔ doz. $15.00
Improved Bay State ..... ℔ doz. $36.00
Little Star ..... ℔ doz. $5.00
New Lightning ..... ℔ doz. $7.00
Reading 72 ..... ℔ doz. $3.25
Reading 78 ..... ℔ doz. $6.25
Rocking Table ..... ℔ doz. $6.20
Turn Table '98 ..... ℔ doz. $6.00
White Mountain ..... ℔ doz. $5.00

Potato—

Saratoga ..... ℔ doz. $7.00
White Mountain ..... ℔ doz. $6.00

Picks and Mattocks—

List Feb. 23, 1899 ..... 70&65@75%
Cronk's Handled Garden Mattock, ℔ doz., $6.40 ..... 33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass ..... 60@60&10%
Iron, list Nov. 11, '85 ..... 60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
Standard, 2-6 in. 60%
Extra Heavy, 2-6 in. 70%
Fittings 75%

Pipe, Merchant—

Carload Lots.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
⅛ & ¼ in.	67½%	51½%	65½%	49½%
⅜ & ½ in.	71½%	59½%	69½%	57½%
¾ to 6 in.	75½%	65½%	74 %	64 %
7 to 12 in.	70½%	55½%	69 %	53½%

Pipe, Sewer—

Carload lots.
Standard Pipe and Fittings, 2 to 24 in.:
New England 71%
New York and New Jersey 74%
Maryland, Delaware, E. Pa. 78%
West. Pa. and West Va. 80%
Virginia 76%
Ohio, Michigan and Ky. 80%
Indiana 80%
NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual. ..... 40&10%
Bench, Second qual. ..... 50&10%
Molding ..... 33⅓&10%
Bailey's (Stanley R. & L. Co.) 40%
Chapin-Stephens Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Toy and German ..... 40@40&10%
Chaplin's 60%
Ohio Tool Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Adjustable Wood Bottom 60%
Union 60%

Iron Planes—

Bailey's (Stanley R. & L. Co.) 40%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) 30%
Ohio Tool Co.'s Iron Planes 60%
Sargent's ..... 60&10%
Union 60%

Plane Irons—

Wood Bench Plane Irons ..... 25&10@30%
Buck Bros. 30%
Chapin-Stephens Co. ..... 30@30&10%
Ohio Tool Co. 30%
Stanley R. & L. Co. 35%
Union 50%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse ..... ℔ doz. $8.50

Plates—

Pelloc ..... lb. 3¾@4¼¢
Self-Sealing Pie Plates (S., S. & Co.), ℔ doz. $2.00 ..... 50%

Pliers and Nippers—

Button Pliers ..... 75&10@80%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $3.00 $3.75
Acme Nippers ..... 50@50&5%
Cronk & Carrier Mfg. Co.:
American Button ..... 75&10%
Cronk's 60%
Improved Button ..... 60&10%
Stub's Pattern 50%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers ..... 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10&10%
Chapin's Imp. Brass Cor. 10@40&10&10%
Pocket Levels ..... 30@30&10&10%
Disston's Plumbs and Levels 70%
Disston's Pocket Levels 70%
C. E. Jennings & Co.'s Iron 33⅓%
C. E. Jennings & Co.'s Iron, Adjustable ..... 40&7½%
Stanley R. & L. Co. 45%
Stanley's Duplex 35%
Woods' Extension 33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00 ..... 50%

Points, Glaziers'—

Bulk and 1-lb. papers, lb. 8½@9 ¢
½-lb. papers ..... lb. 9 @9½¢
¼-lb. papers ..... lb. 9¾@10¼¢

Pokes, Animal—

Ft. Madison Hawkeye ..... ℔ doz. $3.25
Ft. Madison Western ..... ℔ doz. $4.00

Police Goods—

Manufacturers' Lists ..... 25@25&5%
Tower's 25%

Polish—Metal—

Prestoline Liquid, No. 1 (⅛ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72 ..... 40%
Prestoline Paste ..... 40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz. $2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can ..... each, $0.65
Ladd's Black Beauty, gr. $10.00 ..... 50%
Joseph Dixon's, ℔ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr. $4.50 ..... 10%
Japanese ..... ℔ gr. $3.50
Jet Black ..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans, ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail ..... each 70¢
Black Silk, ½ lb box ..... ℔ doz. $1.00
Black Silk, 5 oz. box ..... ℔ doz. $0.75
Black Silk, ½ pt. liq. ..... ℔ doz. $1.00

Poppers, Corn—

1 qt., Square ..... gro. $9.00
1 qt., Round ..... gro. $10.00
1½ qt., Square ..... gro. $11.00
2 qt., Square ..... gro. $13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled 40%
Tinned 35%

Powder—

In Canisters:
Duck, 1 lb. ..... each 45¢
Fine Sporting, 1 lb. ..... each 75¢
Rifle, ½-lb. ..... each 15¢
Rifle, 1-lb. ..... each 25¢
In Kegs:
12½-lb. kegs $2.50
25-lb. kegs $4.50
King's Semi-Smokeless:
Keg (25 lb bulk) $6.50
Half Keg (12½ lb bulk) $3.50
Quarter Keg (6¼ lb bulk) $1.90
Case 24 (1 lb cans bulk) $6.50
Half case (1 lb cans bulk) $4.50
King's Smokeless: Shot Gun. Rifle.
Keg (25 lb bulk) $12.00 $15.00
Half Keg (12½ lb bulk) .. 6.25 7.75
Quarter Keg (6¼ lb bulk) .. 3.25 4.00
Case 24 (1 lb cans bulk) .. 14.00 17.00
Half case 12 (1 lb c. bk) .. 7.25 8.75
Robin Hood Sm'less Shot Gun. 50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co. ..... 20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00 ..... 50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Cork—

Invincible Cork Puller $21.00

Pullers, Nail—

Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00 ..... 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $30.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
Pelican, ℔ doz. $9.00 ..... 40&10%
Scranton, Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots, ℔ doz. $6.00
Diamond B, No. 3, case lots, ℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15 ..... 40%

Pulleys, Single Wheel—

Inch	*1½*	*1¾*	*2*	*3*
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., ¼ in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction ..... 60&10%
Dumb Waiter, Anti-Friction ..... 60&10%
Electric Light 60%
Side, Anti-Friction ..... 60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in. ..... 16@19¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in. ..... 16@19¢
Acme ..... 1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 7, 2 in. ..... ℔ doz. 50%
Grand Rapids All Steel Noiseless 50%
Ideal ..... 70&10%
Niagara ..... 1¾ in., 16¢; 2 in., 19¢
No. 26, Troy ..... 1¾ in., 14½¢; 2 in., 16½¢
Star ..... 1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern ..... 60@60&10%
Pitcher Spout ..... 80@80&10%
Wood Pumps, Tubing, &c. ..... 45@50%
Barnes Dbl. Acting (low list) 50%
Barnes' Pitcher Spout ..... 75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ℔ doz. $7.20
Flint & Walling's, Fast Mail Hand, (low list) 50%
Flint & Walling's Fast Mail (low list) ..... 55&5%
Flint & Walling's Tight Top Pitcher. 80%
National Specialty Mfg. Co., Measuring, $6.00 ..... 30%
Mechanical Sprayer $7.20
Myers' Pumps (low list) 50%
Myers' Power Pumps 50%
Myers' Spray Pumps 50%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	*2*	*2¼*	*2½*	*2¾*
	$2.20	2.50	2.75	3.00
Inch...	*3*	*3¼*	*3½*	*3¾*	*4*
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	*2½*	*3*	*3½*	*4*
	$2.75	3.85	5.00	6.00

Punches—

Saddlers' or Drive, good ..... doz. 50@75¢
Spring, single tube, good quality ..... $1.75@2.00
Revolving (4 tubes) ..... doz. $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive. 50%
Bemis & Call Co.'s Check 55%
Morrill's No. 1 (A.B.C.), ℔ doz. $15.50 ..... 50%
No. 2, ℔ doz. $22.50 ..... 50%
Hercules, each $7.50 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches ..... 55&10%
Steel Screw, B. & K. Mfg. Co. 50%
Tinners' Hollow, P., S. & W. Co. 35@35&5%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44 ..... 60%

Rail—Barn Door, &c.—

Cast Iron Barn Door; Flange Screw Holes for Rd. Groove Wheels:

½	⅝	¾ in.	
$2.50	$3.00	$4.40	*100 feet.*

Angular for Sq. Groove Wheels:

Small.	*Med.*	*Large.*	
$2.00	$2.70	$3.60	*100 feet.*

Sliding Door, Painted Iron ..... 2½@2¾¢
Sliding Door, Wrought Brass, 1½ in., lb., 36¢ 30%
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5½¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail ..... ℔ ft. 3¢
O. N. T. Rail ..... 2¾¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.70; 1¼ in., $4.40.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in. ..... ℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.40.
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢ 50%
None Better ..... ℔ ft. 3¾¢
Standard ..... ℔ ft. 4 ¢
Myers' Stayon Track 60%
Richards' Mfg. Co.:
Common 1 x 3-16 in., $2.75; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail $4.40
Fire Door Track, ℔ ft., 2¼ x ⅝, 15¢; 2¼ x ¾, 9¢.
Lag Screw Rail, No. 65 ..... 40%
Gauge Trolley Track, ℔ ft., No. 31, 10¢; No. 32, 15¢; No. 33, 24¢.
Safety Door Hanger Co.'s Storm King Safety 60%
Safety Door Hanger Co.'s U. S. Standard 60%
Stowell's:
Cast Rail ..... ℔ ft. 1¾¢
Steel Rail, Plain 25%
Wrought Bracket, 1 3-16 in. ..... ℔ ft. 3¢
Wrought Bracket, 1¼ x 5-16.. ℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢ 60%
P. L. B. Steel Rail ..... ℔ 100 ft. $3.00
No. 0, 1 x 3-16 ..... ℔ 100 ft. $2.75

Rakes—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Fort Madison Red Head Lawn $3.25
Fort Madison Blue Head Lawn $2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net $4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 75&25%
Queen City Lawn, ℔ doz., 20 teeth, $3.45; 24, $3.60.
Anticlog Lawn, ℔ doz. $1.00
Malleable Garden ..... 70&10%
Kohler's:
Lawn Queen, 20-tooth ..... ℔ doz. $3.45
Lawn Queen, 24-tooth ..... ℔ doz. $2.60
Paragon, 20-tooth ..... ℔ doz. $2.75
Paragon, 24-tooth ..... ℔ doz. 33.00
Steel Garden, 14-tooth ..... ℔ doz. $2.88
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00
Weldless Steel Garden ..... 75&5%

Rasps, Horse—

Disston's 75%
Heller Bros. ..... 70&5@70&10&5%
McCaffrey's American St'd ..... 60&10&5%
New Nicholson ..... 70&10@75%
See also Files.

Razors—

Borasic 60%
Fox Razors, No. 42, ℔ doz. $20.00
Fox Razors, No. 44, ℔ doz. $20.00
Fox Razors, No. 82, Platina, ℔ doz. $25.00 } 40 & 10 Dis.
Red Devil 60%
Silberstein:
Carbo Magnet $18.00
Griffon, No. 65 ..... $15.00
Griffon, No. 00 ..... $12.00
All other Razors 40%

Safety Razors—

Silberstein 40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo 20%
Aluminum, German Silv., Bronze. 25%
1240 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 20%
2904 P 33⅓%
2904 PN 33⅓%
0924 N 33⅓%
02084 N 33⅓%
002904 PN 33⅓%
802 N 33⅓%
986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—*List July 1, 1903.*

Black Jap 75%
Bronzed 75%

Revolvers—

Single Action ..... 95¢@$1.00
Double Action, except 44 cal. $1.85
Double Action, 44 caliber $2.00
Automatic $3.45
Hammerless $4.00
NOTE.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in. ..... per doz. $2.25@$2.50
17 in. ..... per doz. $2.50@$2.75
18 in. ..... per doz. $2.75@$3.00

Rings and Ringers—

Bull Rings—

	2	*2½*	*3 inch.*
Steel	$0.70	0.75	0.80 doz.
Copper	1.05	1.15	1.40 doz.

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes ..... $4.00@4.50
Hill's Ringers, Gray Iron ..... doz. 50@55¢
Hill's Ringers, Malleable Iron ..... doz. 70@75¢
Blair's Rings ..... per gro. $4.75@5.25
Blair's Ringers ..... per doz. $0.60@ .65
Brown's Rings ..... per gro. $5.00@5.50
Brown's Ringers ..... per doz. $0.60@ .65

Rivets and Burrs—

Copper ..... 50&10@60%
Iron or Steel ..... 75@75&5%

Rollers—

Acme, Stowell's Anti-Friction 50%
Barn Door, Sargent's list 60%
Cronk's Stay ..... 72¢
Cronk's Brinkerhoff ..... 90¢
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53. 50%
O. K. Adj. and Reversible, No. 58. 50%
Lag Screw, Nos. 55 and 57 ..... 50%
Fire Door, No. 59 ..... 40%
Favorite, No. 54 ..... 40%
Stowell's Barn Door Stay ..... ℔ doz. $1.00
Swett's Anti-Friction 50%
Screw and Spike Stay ..... ℔ doz. 65¢
Hinge Adjustable Stay ..... ℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger: Pure ..... lb. 11¾@12¢
Sisal, 7-16 in. diam. and larger: Mixed ..... lb. 8@8¼¢
Pure ..... lb. 9½@9¾¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed ..... lb. 8@8¼¢
Pure ..... lb. 9½@9¾¢

Sisal, Tarred, Medium Lath Yarn:
Mixed ..... *lb.* 7½¢
Pure ..... *lb.* 9@9¼¢
Cotton Rope: *Lb.*
Best, ¼-in. and larger ..... 16¢
Medium, ¼-in. and larger ... 14¢
Common, ¼-in. and larger . 10½¢
Jute Rope:
Thread No. 1, ¼-in. & up. lb. 6½¢
Thread No. 2, ¼-in. & up, lb. 5¾¢
Old Colony Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—

Galvanized ..... 42½@42½%
Plain ..... 50@42½%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute 50%
Sisal ..... 30&10%
Covert Saddlery Works ..... 60&5%

Rules—

Boxwood ..... 60@10@10%
Ivory ..... 35@10@35@10@5%
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Flexifold ..... 27½&10&10&2½%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 50@50&10&10%
Combination ..... 55@55&10%
Stationers' ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber 60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag 40%
Zig Zag, Pin Joint 42½%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—

See *Balance, Sash.*

Sash Locks—

See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers

See *Stuffers or Fillers, Sausage.*

Saw Frames—

See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 50%
Band ..... 50&10@60%
Cross Cuts ..... 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c. 40%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 14 in. wide 60%
Band, ¼ to 1⅝ 60%
Crosscuts 50%
Narrow Crosscuts 55%
Mulay, Mill and Drag 50%
Framed Woodsaws 35%
Woodsaw Blades 35%
Woodsaw Rods 25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 35%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws.50%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws ..... 35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws....40&10@60%
Butcher Saws Blades ..... 35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saws—

Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 30%
Fitchburg File Works, The Best....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades 40%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades..... 35%
Diamond Hack Saw Frames..... 50%
Star Hack Saws and Blades..... 15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames...30&10&10%

Scroll—

Barnes' No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $15; with boring attachment, $20 ..... 30%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $4.00 ..... 15&10%

Scalers, Fish—

Covert's Saddlery Works ..... 60&10%

Scales—

Family, Turnbull's .... 50@50&10%
Counter.
Hatch, Platform, ½ oz. to 4 lbs. ..... *doz.* $5.50
Two Platforms, ½ oz. to 8 lbs. ..... *doz.* $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
Chicago Scale Co.:
The "Little Detective" ....25 lbs 50%
Union or Family No. 2 ..... 60%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list).25@35%
"The Standard" Portables 50%
"The Standard" R. R. and Wagon.50%

Scrapers—

Box, 1 Handle ..... *doz.* $2.00@2.25
Box, 2 Handle ..... *doz.* $2.60@2.85
Ship .... *Light, $2.00; Heavy, $4.50*
Adjustable Box Scraper (S. R. & L. Co.), $6.00 ..... 45%
Chapin-Stephens Co., Box ..... 50@50&10%

Screens, Window and Frames—

Air Line Pattern Screens ..... 60&10%
Flyer Pattern Screens..60&10@60&10&5%
Maine Screen Frames ..... 40&10&5%
Perfection Screens ..... 60&10@60&10&5%
Phillips' Screen Frames...60&5@60&10%
See also *Doors.*

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@ 2.75; 1½, $3.00@3.25; 1¼ .$3.50@3.75
Bench, W'd, Beech .doz. 30@30&5%
Hand, Wood ..... 30@30&5%
R. Bliss Mfg. Co., Hand....30@30&10%
Chapin-Stephens Co., Hand..30@30&10%
Ohio Tool Co., Bench and Hand..30%

Coach, Lag and Hand Rail—

Lag, Cone Point, list Oct. 1, '99 ..... 75&17½%
Coach, Gimlet Point, list Oct. 1, '99 ..... 75&12½%
Hand Rail, list Jan. 1, '81 .... 70&10@75%

Jack Screws—

Standard List ..... 75&10@80&5%
Millers Falls ..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P., S. & W. ..... 50@50&5%
Sargent ..... 70&10%
Swett Iron Works ..... 75&10@80&5%

Machine—

List Jan. 1, '98:
Flat or Round Head, Iron .... 50@50&10%
Flat or Round Head, Brass .... 50@50&10%

Set and Cap—

Set (Iron) 80%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap 75%
Hex. Hd. Cap 75%
Rd. Hd. Cap ..... 60&10%
Fillister Hd. Cap ..... 60&10&10%

Wood—

List July 23, 1903.
Manufacturers' printed discounts:
Flat Head, Iron ..... 87½&10@..%
Round Head, Iron ... 85 &10@..%
Flat Head, Brass ... 85 &10@..%
Round Head, Brass .. 80 &10@..%
Flat Head, Bronze ... 77½&10@..%
Round Head, Bronze .75 &10@..%
Drive Screws ..... 87½&10%

Scroll Saws—

See *Saws, Scroll.*

Scythes—

	Per doz.
Prices announced for next season:	
Clipper Pattern, Grass	*$6.20*
Full Polished, Clipper	*$8.75*
Grain	*$8.00*
Clipper, Grain	*$8.25*
Weed and Bush	*$6.25*

Seeders, Raisin—

Enterprise ..... 25@30%

Sets— Awl and Tool—

Aiken's Sets, Awl and Tools:
No. 20, ℔ doz. $10.00 ..... 50&10&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00
Octagon ..... *gro.* $3.50@3.75
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro. $12..25%
Mayhew's ..... ℔ gro. $9.00
Snell's Cannon's Diamond Point.... ℔ gro. $7.20
Snell's Cor'gated, Cup Pt...℔ gro. $7.20
Snell's Knurled, Cup Pt....℔ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt. ℔ gro. $7.50

Rivet—

Regular list ..... 75@75&10%

Saw—

Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut 30%
Plate 20%
Disston's Star and Monarch 25%
Morrill's No. 1, $15.00 ..... 50%
Nos. 3 and 4, Cross Cut, $20.63.... 50%
No. 5, Mill, $30.00 ..... 50%
Nos. 10, 11, 95, $15.63 ..... 50%
No. 1 Old Style, $10.00 ..... 50%
Special, $16.25 ..... 50%
Giant Royal, Cross Cut ..... ℔ doz. $8.50
Royal, Hand ..... ℔ doz. $5.00
Taintor Positive ..... ℔ doz. $6.75

Shaving—

Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00

Sharpeners, Knife—

Chicago Wheel & Mfg. Co. 65%

Shaves, Spoke—

Iron ..... *doz.* $1.10@1.25
Wood ..... *doz.* $1.75@2.25
Bailey's (Stanley R. & L. Co.) 45%
Razor Edge (Stanley R. & L. Co.)..35%
Chapin-Stephens Co. ..... 30@30&10&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

Shears—

Cast Iron..	*7*	*8*	*9 in.*	
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good ...	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap ..	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap ....70@70&10%
Best quality, Nickel . 60@60&10%
Fair quality, Jap .... 80@80&5%
Fair quality, Nickel . 75@75&10%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson's Hedge, 1900 list 45%
Wilkinson's Branch, Lawn & Border.40%
Wilkinson's Sheep, 1900 list 50%

Tinners' Snips—

Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 40&10@50%
Forged Handles, Steel Blades, Berlin, 40@40&10%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6¼ to 10 in. 50%
Niagara Snips 40%
P., S. & W. Co. 20%

Pruning Shears and Tools

Cronk's Grape Shears 33⅓%
Cronk's Pruning Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades..40@40&5%
Orange Shears ..... 50&10@50&20%
Grape ..... 40&10@50%
Tree Pruners 75%
P., S. & W. Co. 33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading 40%
R. & E. list 33⅓%
Wrightsville Hatfield Pattern 80%

Sliding Shutter—

Reading list 40%
R. & E. list 33⅓%
Sargent's list ..... 50&10%

Shells—Shells, Empty—

Brass Shells, Empty:
First quality, all gauges ..... 60&5%
Climax, Club, Rival, 10 and 12 gauge ..... 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge..20%
Climax, Union, League, New Rival, 10 and 12 gauge 25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list)..20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge ..... 33⅓&5%
Robin Hood, Low Brass ..... 20&10%
Robin Hood, High Brass ..... 30&10%

Shells, Loaded—

Loaded with Black Powder ..40%
Loaded with Smokeless Powder: medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass 50%
Comets, High Brass ..... 50&10&5%

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... per keg $4.00
Steel ..... per keg $3.75
Burden's, all sizes ..... ℔ keg $3.90

Shot—

Drop, up to B, 25-lb. bag $1.65
Drop, B and larger ..... *per 25-lb. bag,* $1.90
Buck, 25-lb. bag $1.90
Chilled, 25-lb. bag $1.90

Shovels and Spades—

Association List, Nov. 15, 1902..40%

Sieves and Sifters—

Hunter's Imitation ..... *gro.* $10.50@11.00
Hunter's Genuine ..... *per gro.* $12.00@12.50
Buffalo Metallic Bined, S. S. Co., ℔ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

Shaker (Barler's Pat.) Flour Sifters, ℔ doz., $2.00 ..... 20%

Sieves, Seamless Metallic

	—*Per dozen.*—			
Mesh	*14*	*16*	*18*	*20*
Iron Wire....	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire..	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... *doz.* $0.90@0.95
Mesh 20, Nested .... *doz.* $1.00@1.05
Mesh 24, Nested .... *doz.* $1.30@1.40

Sinks, Cast Iron—

Standard list ..... 60@60&10%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron ..... 80&10@80&10&10%
Steel ..... 40@40&10%

Slates, School—

Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&5 tens
Victor A, Noiseless ..... 60&5 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German ..... 40@40&10%
Covert Mfg. Co.:
Derby ..... 30&2%
High Grade 35%
Jockey 35%
Trojan ..... 30&2%
Yankee ..... 30&2%
Yankee Roller ..... 30&2%
Covert's Saddlery Works:
Crown 60%
German 60%
Model 60%
Triumph 60%
Oneida Community:
Solid Swivel 60%
Sargent's Patent Guarded....66⅔&10%

Snaths—

Scythe 50%

Snips, Tinners—See *Shears.*

Spoons and Forks—Silver Plated—

Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous—

German Silver ..... 60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver 50%

Tinned Iron—

Teas ..... *per gro.* 45@50¢
Tables ..... *per gro.* $0.90@$1.00

Springs— Door—

Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 25%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 30 in. ..... ℔ doz. $1.10
Victor (Coil) ..... 50&10&10%

Carriage, Wagon, &c.—

1¼ in. and Wider:	*Per lb*
Black	*4@4¼¢*
Half Bright	*4@4¼¢*
Bright	*4½@4¾¢*

Painted Seat Springs:
1½ x 2 x 26 ..... *per pr.* 42¢
1½ x 3 x 28 ..... *per pr.* 70¢

Sprinklers, Lawn—

Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24 ..... 30%

Squares—

Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron. } 75@75&5%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Sq. and T-Bevels....70%
Winterbottom's Try and Miter, No. 1, 40%; No. 2 ..... 50%

Squeezers, Lemon

Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... *doz.* $1.00
Good Grade ..... *doz.* $1.25
Tinned Iron ..... *doz.* $0.75@1.25
Iron, Porcelain Lined ... *doz.* $1.75

Staples—

Barbed Blind ..... *lb.* 6@6½¢
Electricians', Association list .. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples ..... *per lb.* 3½@3½¢
Grand Crossing Tack Co.'s list..80&10%

Steels, Butchers'—

Dick's 30%
Foster Bros.' 30%
C. & A. Hoffmann's 40%

Steelyards — .... 30@30&10%

Stocks and Dies—

Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates 25%
Gardner Die Stocks No. 1 ..... 50%
Gardner Die Stocks, larger sizes....40%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stone—Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ℔ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots ..... ℔ gro. $9.00
One gross or more ..... ℔ gro. $7.20
Lots of 10 gross or more..℔ gro. $6.00

Pike Mfg. Co., 1901 list:
Black Diamond S. S. ℔ gro. $12.00
Lamoille S. S. ℔ gro. $11.00
White Mountain S. S. ℔ gro. $9.00
Green Mountain S. S. ℔ gro. $6.00
Extra Indian Pond S.S. ℔ gro. $7.50
No. 1 Indian Pond S.S. ℔ gro. $7.00
No. 2 Indian Pond S.S. ℔ gro. $4.50
Leader Red End S. S. ℔ gro. $4.50
Emery and Corundum, 10 in.. ℔ gro. $9.00 } 33⅓%
Pure Corundum, 10 in., ℔ gro, $12
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Oil Stones, &c.—

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit. 50%
Gem Corundum Axe, Single or Double Grit. 55%
Gem Corundum Slips. 55%
Gem Corundum Razor Hones. 50%
Pike Mfg. Co., 1901 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1. $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢ } 33⅓%
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips. 90¢
Rosy Red Slips. 90¢
Washita Slips, Extra. 80¢
Washita Slips, No. 1. 70¢
Washita Slips, No. 2. 40¢
India Oil Stones (entire list) 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit. 33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit. 33⅓%
Quickcut Emery Rubbing Bricks. 33⅓%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small.. ℔ lb 10¢
Axe Stones (all kinds).
Turkey Oil Stones, Extra, 5 to 8 in. ℔ lb 80¢ } 33⅓%
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips. 40¢
Sand Stone. 6¢
Belgian, German and Swaty Razor Hones. 50%
Natural Grit Carving Knife Hones ℔ doz. $3.00
Quick Edge Pocket Knife Hones ℔ doz. $2.50 } 40%
Mounted Kitchen Sand Stone, ℔ doz. $1.50

Stoners, Cherry—

Enterprise ..... 25@30%

Stoppers, Bottle—

Victor Bottle Stoppers..... ℔ gro. $9.00

Stops—Bench—

Millers Falls. 15&10%
Morrill's, ℔ doz., No. 1, $10.00. 50%
Morrill's, No. 2, $12.50. 50%

Door—

Chapin-Stephens Co. 60@60&10%

Plane—

Chapin-Stephens Co. 20%

Straps—Box—

Cary's Universal, case lots. 20&10&10%

Hame—

Covert's Saddlery Works. 60&10%

Stretchers, Carpet—

Cast Iron, 81'l Points. doz. 55@60%
Socket ..... doz. $1.75
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00. 20%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 30&5%

Sweepers, Carpet—

National Sweeper Co.: ℔ doz.
Auditorium, Roller Bearing (26 in. case), Nickel. $54.00
Mammoth, Roller Bearing (30 in. case), Nickel. $60.00
Marion, Roller Bearing, regular finishes, full Nickel. $24.00
Marion Queen, Roller Bearing, full Nickel $24.00
Monarch, Roller Bearing, N'kel. $22.00
Monarch, Roller B'r'g, Jap'ned. $20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel. $36.00
Monarch Extra, Roller Bearing, (17-in. case), Nickel. $36.00
Monarch Extra, Roller Bearing (17-in. case), Japanned. $33.00
National Queen, Fancy Veneers. $27.00
Perpetual, Regular B'r'gs, Nkl. $20.00
Perpetual, Regular B'r'gs, Jap. $18.00
Triple Medal. $24.00

NOTE.—Rebates: 50c per dozen on three-dozen lots, $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks. 90&37½%
American Cut Tacks. 90&37½%
Swedes Cut Tacks. 90&37½%
Swedes Upholsterers' Tacks. 90&50%
Gimp Tacks. 90&50%
Lace Tacks. 90&50%
Trimmers' Tacks. 90&37½%
Looking Glass Tacks. 65%
Bill Posters' and Railroad Tacks. 90&50%
Hungarian Nails. 90&37½%
Finishing Nails. 70%
Trunk and Clout Nails. 80&5%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks. 90&6 or 7 tens
Steel Wire Brads, R. & E. Mfg. Co.'s list ..... 50&10@60%
See also Nails, Wire.

Tanks, Oil—

	Each.
Emerald, S., S. & Co.	30-gal. $3.40
Emerald, S., S. & Co.	60-gal. $4.25
Queen City, S., S. & Co.	30-gal. $3.65
Queen City, S., S. & Co.	60-gal. $4.50

Tapes, Measuring—

American Asses' Skin. 40&10@50%
Patent Leather. 25@30&5%
Steel ..... 40@40&10%
Chesterman's. 25@25&5%
Eddy Asses' Skin. 40&10@50%
Eddy Patent Leather. 25@30&5%
Eddy Steel. 40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin. 40&10@50%
Favorite, Duck and Leather. 25&5@25&10%
Metallic and Steel, lower list. 35@35&5%
Pocket ..... 35@35&5%
Lufkin's:
Asses' Skin. 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather. 25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $3.00

Thermometers—

Tin Case. 80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop. 80&2½%
Monitor, Cross Head, &c. 70%

Brick Ties—

Niagara Brick Ties. 25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works. 60&10%

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White. 20@20&5%

Hay—

Myers' Hay Tools. 50%
Stowell's Hay Carriers. 50%
Stowell's Hay Forks. 50%
Stowell's Fork Pulleys. 50%

Saw—

Atkins' Cross Cut Saw Tools. 40%
Simonds' Improved. 33⅓%
Simonds' Crescent. 25%

Ship—

L. & I. J. White. 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Oneida Pattern. 75&10@75&10&5%
Newhouse ..... 45@45&5%
Hawley & Norton. 65%
Victor and Oneida. 70&10@70&10&5%
O. C. Jump (Blake Pat.). 6&5@60&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ℔ doz. $13.25
No. 3, Rat, ℔ doz. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ℔ doz. $5.25; case of 72 ℔ gro. $4.70 doz.
No. 4, Mouse, ℔ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ℔ doz. $3.00; case of 150 $2.25 doz.

Trimmers, Spoke—

Wood's E 1. 50%

Trowels—

Disston Brick and Pointing. 30%
Disston Plastering. 25%
Disston "Standard Brand" and Garden Trowels. 35%
Kohler's Steel Garden Trowels, 5 in. ℔ gro. $4.80
Kohler's Steel Garden Trowels, 6 in. ℔ gro. $6.00
Never-Break Steel Garden Trowels.. ℔ gro. $6.00
Rose Brick and Plastering. 25&5%
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern. 50&10%
Western Pattern. 60&10%
Handy Trucks. ℔ doz. $16.00
Grocery ..... ℔ doz. $15.00
Daisy Stove Trucks, Improved Pattern ..... ℔ doz. $18.50
McKinney Trucks. each $10.00
Model Stove Trucks. ℔ doz. $18.50

Tubs, Wash—*No. 1 2 3*

Galvanized, per doz. $4.50 5.00 5.75
Galvanized Wash Tubs (S., S. & Co.):

No.	1	2	3	10	20	30
Per doz., net.	$5.70	6.30	7.20	6.60	7.20	8.10

Twine, Miscellaneous—

Flax Twine:	*BC.*	*B.*
No. 9, ¼ and ½-lb. Balls.	*22@24¢*	
No. 12, ¼ and ½-lb. Balls.	*18@20¢*	
No. 18, ¼ and ½-lb. Balls.	*16@18¢*	
No. 24, ¼ and ½-lb. Balls.	*16@18¢*	
No. 36, ¼ and ½-lb. Balls.	*15@17¢*	
Chalk Line, Cotton ½-lb. Balls	*30¢*	

Cotton Mops, 6, 9, 12 and 15 lb. to doz. ..... 9½@11¢
Cotton Wrapping, 5 Balls to lb., according to quality... 13½@20¢
American 2-Ply Hemp, ¼ and ½-lb. Balls. ..... 13@14¢
American 3-Ply Hemp, 1-lb. Balls ..... 13@14¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) ..... 3½¢
India 3-Ply Hemp, 1-lb. Balls. 8½¢
India 3-Ply Hemp, 1½-lb. Balls. 7@8¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls ..... 9@10¢
Mason Line, Linen, ½-lb. Bls. 46¢
No. 26¼ Mattress, ¼ and ½-lb. Balls ..... 37¢
Wool, 3 to 6 ply.... B 4½¢; A 5¢

Vises—

Solid Box. 60&10@60&10&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable. 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50; No. 3, $10.00.
Machinists' and Tool Makers' No. 4, $12.50; No. 5, $7.00; No. 6, $10.00; No. 10, $21.50.
Jewelers' No. 7. $4.00
Fisher & Norris Double Screw. 15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5&70%
Lewis Tool Co. 20@30%
Merrill's 20%
Millers Falls. 60&10%
Massey Vise Co.:
Clincher 40%
Perfect 20%
Lightning Grip. 20%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe. 55@60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists' 40%
Jewelers' 33⅓%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ℔ doz. $30. 25%
Perfection Saw Clamps, ℔ doz.... $5.00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3. 45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip. 15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise ..... 60&10%
Holland's Combination Pipe.. 60@60&5%
Massey's Quick Action Pipe. 40%
Parker's Combination Pipe:
87 Series. 60%
157 Series. 60&5%
No. 870. 40%

Wads—*Price per M.*

B. E., 11 up ..... 60¢
B. E., 9 and 10. 70¢
B. E., 8. 80¢
B. E., 7. 80¢
P. E., 11 up. $1.00
P. E., 9 and 10. 1.25
P. E., 8. 1.50
P. E., 7. 1.50
Dis. 15%
Ely's B. E., 11 and larger. $1.70@1.75
Ely's P. E., 12 to 20.... $3.00@3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled ..... 50@55&10%
Ground ..... 55@60&10%
Plain or Unground. 60@65&10%
Country Hollow Ware, per 100 lbs. ..... $2.75@3.00
White Enameled Ware:
Maslin Kettles. 70%
Covered Wares
Tinned and Turned. 40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware. 50&20%
Agate Nickel Steel Ware, Specials. 60&15%
Iron Clad Ware. 70&10%
Lava, Enameled. 40&10%
Never Break Enameled. 50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Spiders and Griddles. 65@65&5%
Avery Kettles. 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles. 60%
Solid Steel Spiders and Griddles. 65&5%
Solid Steel Kettles. 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone.... 40@40&10%

Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame. $3.25
Red Star, family size, stationary protector $3.25
Double Zinc Surface:
Saginaw Globe, family size, stationary protector. $2.90
Cable Cross, family size, stationary protector. $3.15
Single Zinc Surface:
Naiad, family size, open back, perforated $2.65
Saginaw Globe, protector, family size, ventilated back. $2.50
Brass Surface:
Brass King, Single Surface, open back $3.25
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.25
Glass Surface:
Glass King, Single Surface, open back $3.25
Enamel Surface:
Enamel King, Single Surface, ventilated back. $3.25

Washers—Leather, Axle—

Solid ..... 80&10@80&10&10%
Patent ..... 90@90&5%
Coil: ⅜ 1 1⅛ 1¼ inch. 10¢ 11¢ 12¢ 13¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers ... $4.95 4.05 2.75 2.55 2.35
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Wedges—

Oil Finish. lb. 2.15@2.30¢

Weights—Hitching—

Covert Mfg. Co. 40&2%
Covert's Saddlery Works. 60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District..... $25.00
Southern Territory.. $19.00@20.00
Western and Central Districts ..... $20.00@21.00

Wheels, Well—

8-in., $1.50@1.55; 10-in., $1.65@1.70; 12-in., $2.25@2.35; 14-in., $3.40@3.50.

Wire and Wire Goods—

Bright and Annealed.
6 to 9. 80&5@80&7½%
10 to 18. 80@80&5%
19 to 26. 80&10@80&10&5%
27 to 36. 80&5@80&10%
Galvanized:
6 to 9. 77½@77½&5%
10 to 14. 72½@72½&5%
15 to 16. 75&7½@75&10&2½%
19 to 26. 75&5@75&10%
27 to 36. 72½&5@72&7½%
Coppered:
6 to 9. 77½@77½&5%
10 to 14. 77½@77½&7½%
15 to 18. 75&10@75&10&2½%
19 to 26. 75&10&5@80%
27 to 36. 75@75&5%
Tinned:
6 to 14. 77½@77½&7½%
15 to 18. 75&5@75&10%
Annealed, Steel and Tinned, on Spools .. 70&10&10@70&10&10&10%
Brass and Copper on Spools... 60&10@60&10&10%
Brass, list Feb. 26, '96. .... 30&5%
Copper, list Feb. 26, '96. ..... 15%
Cast Steel Wire. 50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, 1903. 90&10&10&10@.. %

Wire Cloth and Netting—

Galvanized Wire Netting..... 80&15@80&17½%
Painted Screen Cloth, 100 ft., $1.20
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3¢
Nos. 4 and 5 Mesh, sq. ft.. 3½¢
No. 6 Mesh, sq. ft. ..... 3½¢
No. 8 Mesh, sq. ft. ..... 4¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .... 75&10@75&10&10%
Alligator or Crocodile.. 70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S. ..... 45@45&5%
Acme ..... 60&10%
Alligator Pattern. 70%
Bull Dog. 70%
Bemis & Call's:
Adjustable S. 40%
Adjustable S Pipe. 40%
Bemis Pipe. 60%
Briggs Pattern. 40%
Combination Black. 40&5%
Combination Bright. 40%
Merrick Pattern. 50%
Boardman's 33⅓%
Coes' Genuine Knife Hdl.. 40&10&5&5%
Coes' Genuine Steel Hdl.. 40&10&5&5%
Coes' Genuine Key Model.. 40&10&5&5%
Coes' "Mechanics'".... 40&10&10&5&5%
Donohue's Engineer. 40&10%
Eagle ..... 50&10%
Elgin Wrenches, ℔ doz. $6.25
Elgin Rethreading Attachment, ℔ doz. $6.25
Elgin Extra Dies and Jaws. 50%
Gem Pocket. 30%
Hercules 70%
W. & B. Machinist:
Case lots. 50&5%
Less than case lots. 50%
Improved Pipe (W. & B.). 60%
Solid Handles, P., S. & W.. 50@50&5%
Stillson 65%
Vulcan Chain. 50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ℔ gross, $7.50; ℔ doz. $0.80

Wrought Goods—

Staples, Hooks, &c., list March 17, '02 ..... 90@90&10%

Yokes, Neck—

Covert Saddlery Works, Trimmed.. 70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' ..... list net

Zinc—

Sheet..... per 100 lbs. $7.75@8.00